

Service Manual

74 PMD740 / 00B/02B/07B

6 Channel mixer/4 Track recoder

For repair information of the cassette mechanism
see Service Manual of "Recorders tape deck
NMZ-3110DH-2

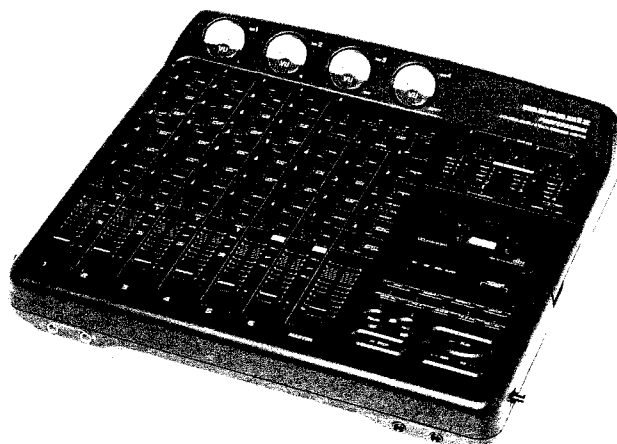


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ORDERING PARTS

Parts can be ordered either by mail or by telex. In both cases, the correct part number has to be specified. The following information must be supplied to eliminate delays in processing your order:

1. Complete address
2. Complete part numbers and quantities required
3. Description of parts
4. Model number for which the part is required
5. Way of shipment
6. Signature: any order form or telex must be signed, otherwise such part order will be considered as null and void.

ADDRESSES

AUSTRALIA
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GREECE
ADAMCO ELECTR. SA
P.O.Box 21025
Hippocratus Str. 188
Athens 11471
Greece

All of the above locations are fully equipped to take care of your total service needs or can advise you. Because various countries have differing configuration requirements, it is necessary that you contact the service facility in your particular country. In the event that there is no service location listed for your country, please contact the nearest facility for the necessary assistance.

In case of difficulties, do not hesitate to contact the Technical Department at above mentioned address.

1. SPECIFICATIONS AND SERVICE DATA

MECHANICAL CHARACTERISTICS

Tape	C-60 and C-90 type for CrO ₂ only (70 μ s EQ)
Track Format	4-track, 4-channel
Head Configuration	4-channel record/playback (permalloy) x 1 4-channel erase (ferrite) x 1
Motor	DC servo motor x 1
Tape Speed	Normal 4.8cm/sec \pm 1% High 9.5cm/sec \pm 1%
Pinch Control	\pm 10%
Fast Wind Time	Approx. 110 seconds for C-60
Maximum Dimensions (W x H x D)	438 x 98 x 384 mm
Weight	4.2 kg

ELECTRICAL CHARACTERISTICS

Mic/Line Input (x 6)	
Source Impedance	Less than 10k ohms
Input Impedance	50k ohms
Nominal Input Level	-50 dBV (3 mV) ~ -10 dBV (0.3V)
Minimum Input Level	-60 dBV (1 mV) Trim Max.
Maximum Input Level	+6 dBV (2.0V) Trim Min.
Insert (x 4) Send (Chip)	
Output Impedance	100 ohms
Nominal Load Impedance	10k ohms
Minimum Load Impedance	2k ohms
Nominal Output Level	-10 dBV (0.3V)
Insert (x 4) Receive (Ring)	
Input Impedance	50k ohms
Nominal Input Level	-10 dBV (0.3V)
Stereo Line Input	
Input Impedance (XLR)	50k ohms (600 ohms)
Nominal Input Level	-10 dBV (0.3V)
Effect/Return (Ring)	
Input Impedance	5k ohms (MONO), 10k ohms (L, R)
Nominal Input Level	-10 dBV
Line Output (2)/Effect Output (x 1)	
Output Impedance	100 ohms
Nominal Load Impedance	10k ohms
Minimum Load Impedance	2k ohms
Nominal Output Level	-10 dBV (0.3V)
Headphone Output (Stereo x 2)	
Nominal Load Impedance	8 ohms
Maximum Output Level	100 mW + 100 mW (8 ohms)
Equalizer (Shelving Type)	
Low Frequency Range	100 Hz
High Frequency Range	10 kHz
Middle Frequency Range	200 Hz ~ 5.4 kHz
Range	\pm 12 dB

RECORDER SECTION

Tape Output (x 4)/Tape Cue Output (x 1)	
Output Impedance	150 ohms
Nominal Load Impedance	10k ohms
Minimum Load Impedance	2k ohms
Nominal Output Level	-10 dBV (0.3V)
Sync Input	
Input Impedance	22k ohms
Nominal Input Level	-10 dBV (0.3V)
Sync Output	
Output Impedance	100 ohms
Nominal Load Impedance	10k ohms
Minimum Load Impedance	2k ohms
Nominal Output Level	-10 dBV (0.3V)
Power Supply	
AC120V 60 Hz (with DA740PMDU)	
AC100V 50/60 Hz (with DA740PMDF)	
AC230V 50 Hz (with DA740PMDN)	
Power Consumption	
AC 9.5W	
Accessories	
AC Adaptor, DA740PMD	

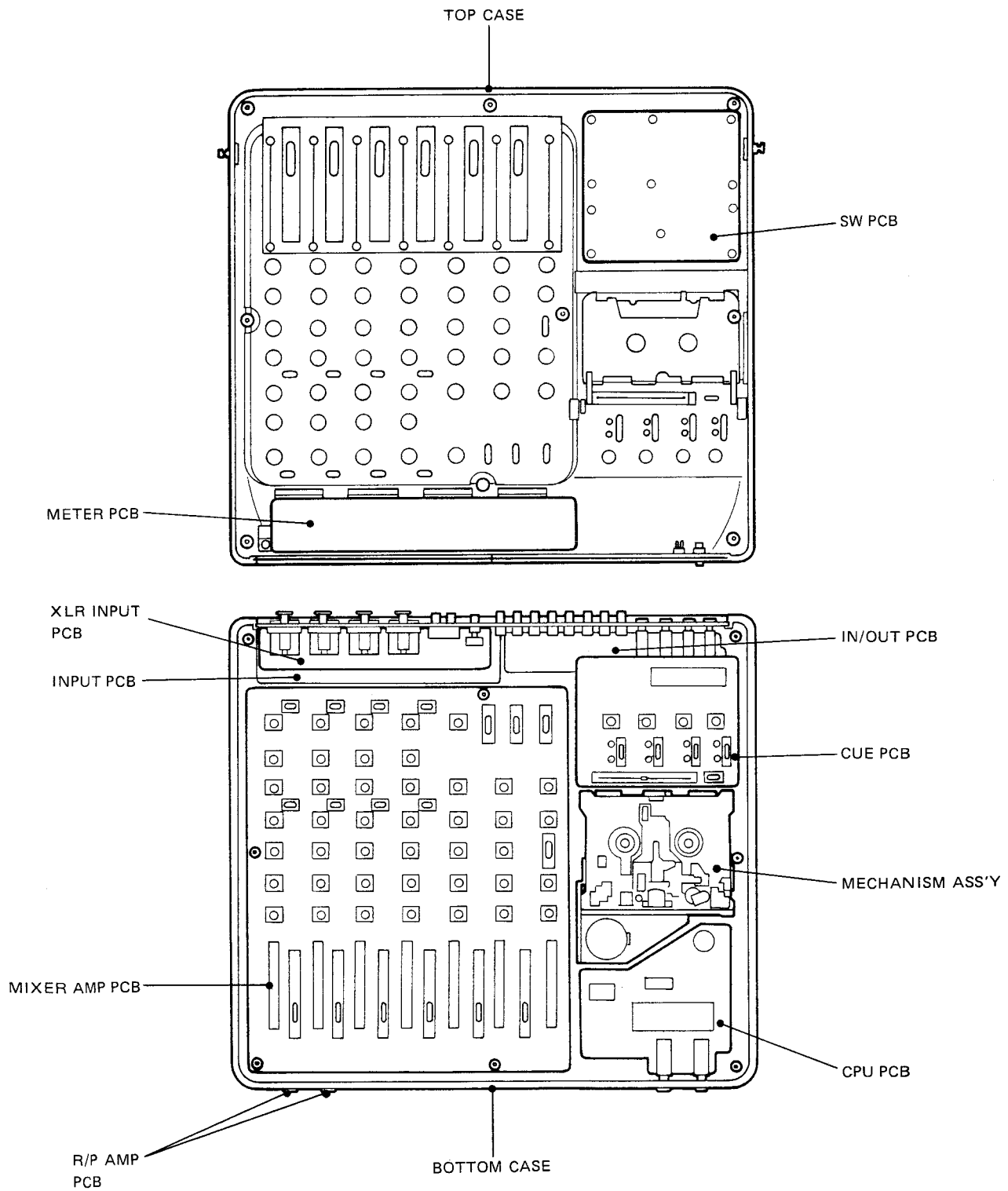
SERVICE DATA

Tape Speed	
Speed Deviation	Normal 3000 Hz \pm 45 Hz High 6000 Hz \pm 90 Hz Within 30 Hz
Speed Variation Range	
Pitch Control	
Minimum	Normal 2700Hz High 5400Hz
Maximum	Normal 3300Hz High 6600Hz
Rewind Torque	
Playback, Record	35 ~ 75g-cm
F.FWD, REW	70 ~ 160 g-cm
Pinch Roller Pressure	
Wow & Flutter	
300 ~ 500g	
0.15% (NAB weighted)	
\pm 0.15% peak (DIN/IEC/ANSI weighted)	
Overall Frequency Response	
Refer to 10-10	
Overall Distortion	
Refer to 10-11	
Overall S/N Ratio	
Refer to 10-12	
Erasing Ratio	
More than 65 dB	

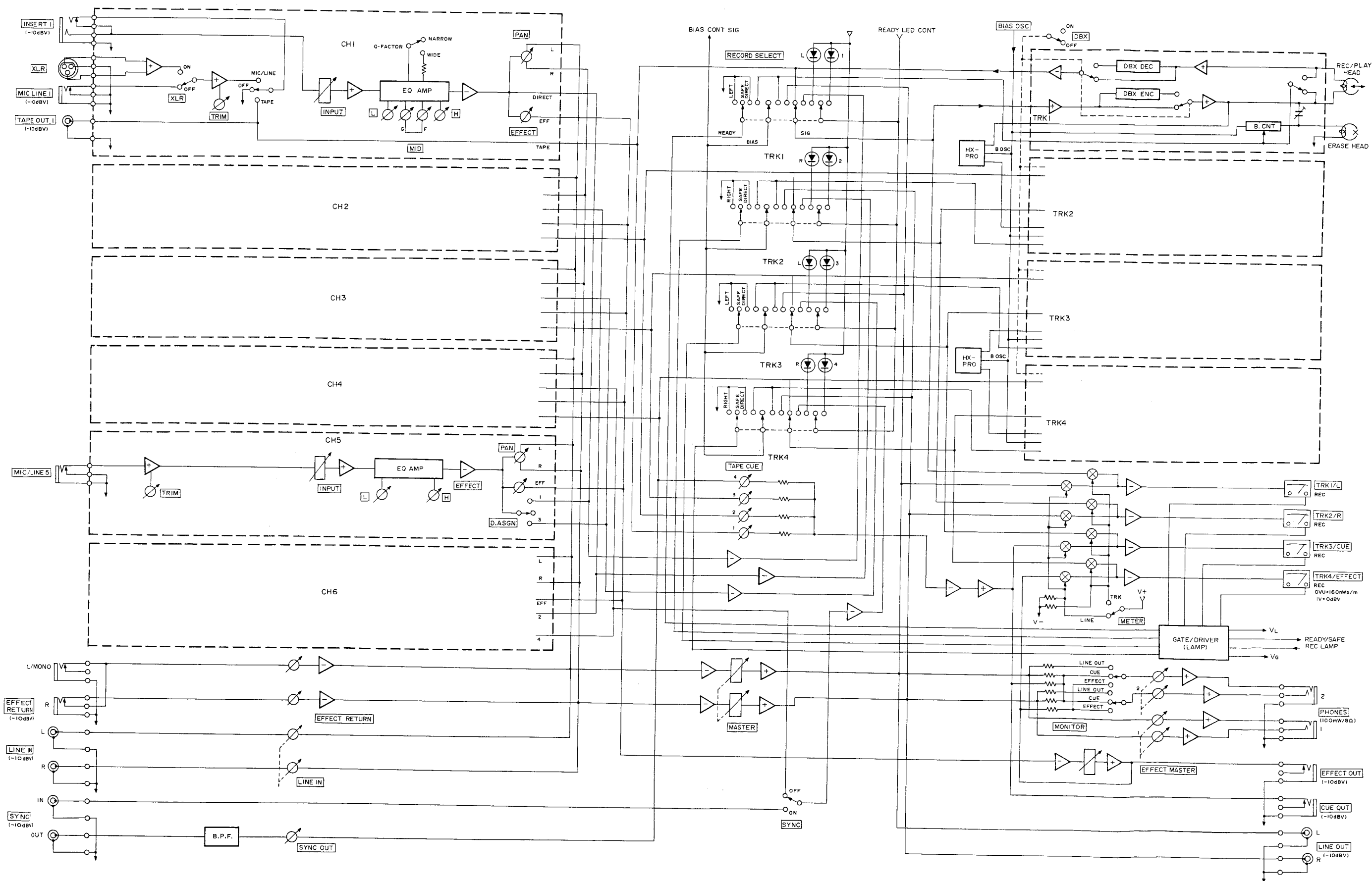
NOTES:

1. In these specifications, 0 dBV is referenced to 1.0 Volt. Actual voltage levels are also given in parenthesis (0.316V for -10 dBV is rounded off and given as 0.3V).
 2. Changes in specifications and features may be made without notice or obligation.
- dbx Noise Reduction system made under license from dbx, Incorporated. The name "dbx" and the dbx symbol are trademarks of dbx, Incorporated.

2. PARTS LOCATIONS



3. BLOCK DIAGRAM



4. CIRCUIT DESCRIPTION

OUTLINE

- 1) This model is basically a six-channel mixer and a four-track cassette recorder which are internally connected for easy editing works such as ping-pong recording, over-dubbing, etc.
- 2) Fig. 3-1 is a block diagram showing overall schematic configuration.
- 3) To clearly understand signal flowing routines in the circuit, following signal routines are assumed as an example.
 - a) An input signal (A) enters from MIC/LINE 1 with the track 1 set to the REC mode and a playback signal (B) is played back with the track 3 set to the PLAY mode.
 - b) When the PAN knobs for the channel 1 and the channel 3 are set to L, the signals (A) and (B) are mixed in the bus line circuit following the circuit and output from LINE OUT L. The mixed signal are recorded on the track 1 side. When the PAN knob is set to R, the signal are output from LINE OUT R and recorded on the track 2 side.
 - c) The LINE OUT output signal, the record source signal, and playback signal can be monitored with meter, headphone, and TAPE CUE OUT etc.
 - d) A SYNC signal (c) is recorded and played back on the track 4.
 - e) There are DIRECT assign function, INSERT terminals (CH1~CH4), EFFECT RETURN input terminal, and EFFECT OUT etc.

5. TEST EQUIPMENT/MATERIAL

Instruments (Specifications)		Usage
Wow & flutter meter	General model. Range: 0.03% or more Sensitivity: 10 mV or better Characteristics: JIS, NAB, DIN/CCIR, WTD/UNWTD	Wow & flutter measurement.
Frequency counter	General model. Sensitivity: 25 mV or better Impedance: 1 megohm or more Frequency range: 1 Hz to 10 MHz	Tape speed measurement, Wow & flutter measurement, Bias oscillation frequency measurement.
DC voltmeter	General model. Digital or analog. Sensitivity 0.1V or better	DC voltage measurement of DBX amp, etc.
AC level meter	General model. Range: -80 dB to +40 dB Impedance: 1 megohm or more, 25 pF or less Frequency band: 30 kHz or more	Signal level measurement, bias adjustment.
Audio oscillator	Frequencies: 10 MHz to 1 MHz Output level: 3V or more/ 600-ohm (variable) Distortion: No more than 0.1%	Input signal supply.
Attenuator	General model. Attenuation: 100 dB or more Step: 0.1 dB Impedance: 600 ohms	Input signal level setting.
Oscilloscope	General model. Sensitivity 20 mV/div. or better Sweep rate: 1 μsec./div. or better	Head azimuth adjustment.
Distortion meter	General model. Frequencies: 400 Hz, 1 kHz Sensitivity: 10 mV or better Measuring range: 0.1% or better	Output signal distortion measurement.
Band-pass filter	General model. Bandwidth: 1 kHz (±10%), 30 dB or more/oct. Bandwidth adjustment: Weighting network, IHF standard	Erase effect measurement, crosstalk measurement.
Test tapes	TCC-111 4.75 cm/sec. TCC-211 9.5 cm/s	Tape speed measurement, wow & flutter measurement.
	TCC-120 A-bex TCC-130 A-bex TCC-142 A-bex	Level (315 Hz/0 dB) Level (Dolby B type), distortion (200 nWb/m).
	TCC-261B A-bex	DIN reference level 31.5 Hz to 14 kHz, head azimuth and frequency response adjustments.
	AC-513 3180 & 70 μs Type II TDK TCC-203B HI-BIAS Type II A-bex	Blank tape (Chrome position).
	TCC-903 t=9μ A-bex	Mirror tape (for tape transport adjustment)
	TCC-194 A-bex	Crosstalk measurement, Separation measurement.
	TCC-152 (8 kHz) A-bex	Azimuth adjustment.
	TCC-284N	Frequency response adjustment (spot).
	THG-801C THG-802	Head gauge Guide gauge

6. MEASUREMENT CONDITIONS FOR MAINTENANCE

- 1) **Power Supply Voltage**
Powered from AC adaptor (DA740PMD): within AC rating voltage ±5%.
- 2) **Reference Voltage 0 dBV = 1.0V**
Reference line input level: -10 dBV (316 mV)
Reference output level: -10 dBV (316 mV)
- 3) Unless otherwise noted, the output load should be 10k ohms.
- 4) The output impedance of the audio oscillator supplying a signal to the MIC/LINE jack(s) should be 600 ohms or less.
- 5) Before proceeding performance checks and alignments for playback and record operations, clean and erase the tape running paths.

7. REMOVAL OF MAJOR PARTS

Sometimes it is difficult to see how to disassemble the parts. The following explains how to remove the major parts.

7-1 TOP CASE AND BOTTOM CASE

- 1) Remove the rotary VR knob (47 psc) and the slide VR knob (8 pcs).
- 2) Remove the nine screws securing the bottom case. (Fig. 7-1)

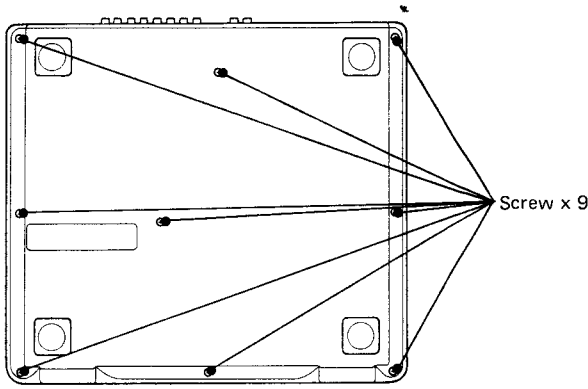


Fig. 7-1 Bottom Case Mounting Screws

7-2 MECHANISM ASS'Y

Remove the top case and pull off the six screws holding the mechanism assembly mounted on the bottom case. (Fig. 7-2)

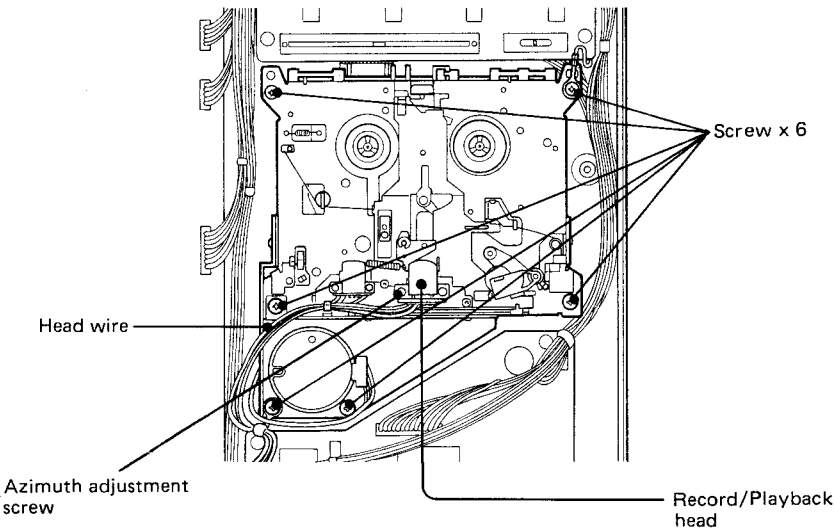


Fig. 7-2 Mechanism Assy

8. MECHANICAL CHECKS AND ADJUSTMENT

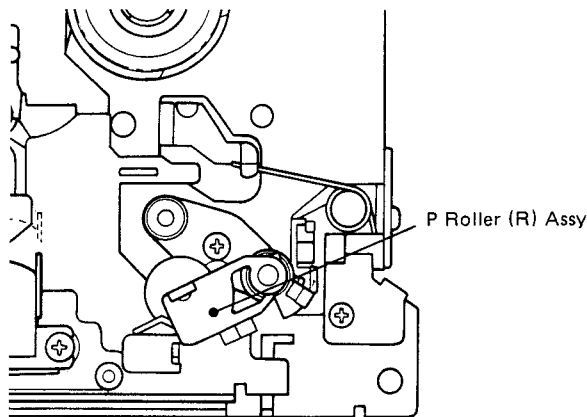


Fig. 8-1 Pinch Roller Pressure

8-1 PINCH ROLLER PRESSURE

First remove the top case as shown in section 7-1.

- 1) Run the deck in PLAY mode and hook a tension gauge to the pinch roller (R) Assy.
- 2) Pull the gauge slowly and read the gauge when the pinch roller just stops rotating: The reading should be between 300 and 500g.

8-2 TAKE-UP TORQUE

Take-Up Torque for Reproducing and Recording

- 1) Load a cassette torque meter instead of a cassette tape in the cassette holder, and run the deck in PLAY mode.
The meter reading should be:
35 to 75 g-cm for Take-up torque (right reel table)
2 to 6 g-cm for Back Tension torque (left reel table)
- 2) If the meter reading of the take-up torque is out of limits, remove the poli-slider washer set on the top of the take-up reel table (right) shaft and change the right reel table.
- 3) If the meter reading of the back tension torque is out of the limits, change the springs under the supplying reel table (left).

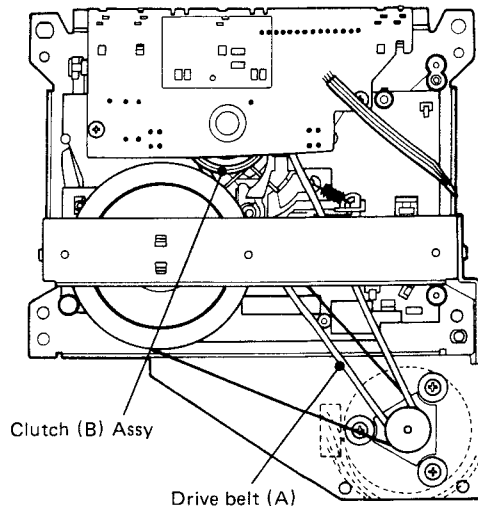


Fig. 8-2 Mechanism Assy PART

8-3 FF AND REW TORQUE

- 1) Load a cassette torque meter in the cassette holder and measure starting torque for both F.F. and REW operations with the tape rewound close to beginning of the tape or wound close to end of the tape, respectively.
The reading should be:
F.F. torque (right reel table): 70 ~ 160 g-cm.
REW torque (left reel table): 70 ~ 160 g-cm.
- 2) If the torque is out of the limits, change Clutch (B) Assy and Drive belt (A) if necessary. (Refer to Fig. 8-2)

8-4 TAPE TRAVEL

Using a mirror tape (TCC-903), check to see that the tape is running stably without curling and touching the tape guides on the erase and rec/play heads.

If there is curling of the tape affecting the response or damaging the tape, it is necessary to check the head guide height, perpendicularity of the head face, and alignment of the pinch roller in relation to the capstan. Mirror tape (TCC-903) and Head Height Adjusting jig (THG801C & THG802) are required for checking.

To check the head guide height, the tape is replaced with the head height check jig (THG801C), which is put on the base. While firmly seating the jig on the surface of the base, slide the jig (THG802) past each head guide to check if it goes through without hitting them.

Using the rear check bar of the jig (THG802), also check perpendicularity of each head face. If the guide is low, insert the required amount of 0.1 mm or 0.2 mm thick washers under the head mounting legs.

NOTE: Always adjust the head azimuth when the head height is adjusted.

8-5 HEAD AZIMUTH

Fine adjustment of the record/playback head should be made after the tape travel check has been completed.

For the erase head, only carry out the adjustment in 8-4 Tape travel.

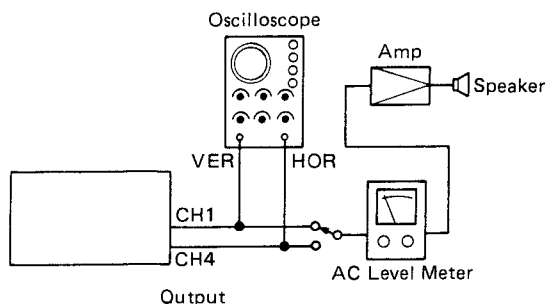


Fig. 8-3

- 1) Connect a vertical input terminal of an oscilloscope to the TAPE OUT "1" jack and a horizontal input terminal to the TAPE OUT "4" jack.
- 2) Load the deck with a test tape and playback the test signal.
- 3) First reproduce a test tone of 315 Hz, and coarsely adjust the azimuth adjusting screw (Fig. 7-2) to obtain approx. zero phase difference as shown in the Fig. 8-4. Next, reproduce a high frequency tone of 10 kHz and proceed to the fine adjustment.

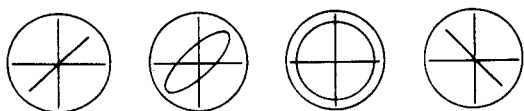


Fig. 8-4

- 4) Confirm that the output level of TAPE OUT 2 & 3 is not relatively low compared with that of TAPE OUT 1 & 4.

8-6 TAPE SPEED

- 1) Connect a frequency counter to either one of TAPE OUT jacks.

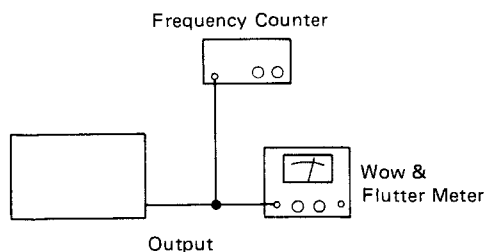


Fig. 8-5

- 2) Playback a wow & flutter test tape and following values will be obtained.

Deviation: $3000 \text{ Hz} \pm 45 \text{ Hz}$ (4.76 cm/sec),

$6000 \text{ Hz} \pm 90 \text{ Hz}$ (9.5 cm/sec)

Width of deviation: Within 30 Hz

Pitch control range*: Minimum 2700 Hz, 5400 Hz.

Maximum 3300 Hz, 6600 Hz.

- * Tape speed becomes minimum with the PITCH control knob turned up to the leftmost and maximum with the PITCH control knob turned up to the rightmost.

- 3) If the speed deviation is out of the limits, adjust as follows;

- a) Remove the top case as mentioned in section 7-1.
- b) Clean the tape path and check the pinch roller pressure and take-up torque.
- c) If they are normal, place the PITCH control in the center "click stop" position and reproduce approx. mid position of the test tape.
- d) Adjust the trim pot RM09 (RM11) (Refer to Fig. 7-2) provided on the CPU PCB with a small "—" driver to obtain $3000 \text{ Hz} \pm 5 \text{ Hz}$ reading on the frequency counter.

The checks and adjustment should be performed at least one minute after the capstan motor has been started to rotate.

- e) First adjust with 9.5 cm/sec., then adjust with 4.75 cm/sec.

8-7 WOW AND FLUTTER

Reproduce Method:

- 1) Connect a wow and flutter meter to one of TAPE OUT jacks.
- 2) Reproduce with a Wow and Flutter Test Tape.
- 3) The measurement should be performed at both beginning and end of the tape.

Specification: 0.15% (NAB weighted)

$\pm 0.15\%$ peak (DIN/IEC/ANSI weighted)

NOTE: Proceed to the measurement after cleaning the tape path, especially capstan shaft, pinch roller, and the head surfaces.

9. MIXER SECTION SIGNAL CHECKS AND ADJUSTMENTS

9-1 INITIAL SETTINGS OF CONTROL SWITCHES AND KNOBS

- Before proceeding adjustments, set each control knob and switch as shown below (as the pre-set condition).
Input fader Max.
Master fader Scale position 7 ~ 8
INPUT selector MIC/LINE
RECORD SELECT switch SAFE
MONITOR switch LINE OUT
PHONES knob Min.
TAPE CUE knob Min.
SYNC knob Min.
TRIM knob LINE (fully counterclockwise)
EQ-HIGH, LOW, MID-GAIN .. Center (click position)
EQ-MID-SHIFT Center
EFFECT knob Min.
EFFECT MASTER knob Max.
EFFECT RETURN knob Min.
PAN knob L (fully counterclockwise)
DBX switch OFF
SYNC switch OFF
METER switch TRK
PITCH CONTROL fader Center (click position)
- Apply -10 dB (316 mV), 1 kHz signal to the MIC/LINE jack (1).
- Under this condition, the signal develops at LINE OUT L. Adjust the input fader of channel 1 so that the output at the LINE OUT L terminal is attenuated by 6 dB. Under this condition, the input fader knob will show 7 ~ 8 on the scale. This position is the reference setting position for the input fader.
- Adjust the MASTER fader until the specified level -10 dBV (316 mV) is obtained on the LINE OUT (L) jack. Under this condition, the MASTER fader will be located at "7 ~ 8" on the scale and the position is the reference setting position. This is named to the reference condition.
- Check that the output signal -10 dBV ± 1 is obtained on the LINE OUT (R) jack when turning the PAN knob clockwise fully (R).
- Under the condition of the preceding step 4, set the input signal level to -50 dBV (3.16 mV), and adjust the TRIM knob so that the level at the LINE OUT L become the specified level -10 dB (316 mV). The position will be approx. max. (MIC) turning clockwise.
- Referring to the steps 2, 3, 5 and 6, set each input line knob of the input channels 2 ~ 6 and check each position.
- Adjust the EFFECT knob from the input fader reference position stated in the step 3, above (with the EFFECT MASTER knob at Max.) until EFFECT OUTPUT level of -10 dBV (316 mV) is obtained.
- With the MASTER fader knob set to the reference position at the reference conditions, feed the signal of -10 dBV (316 mV) to the EFFECT RETURN input jack. Adjust the EFFECT RETURN knob until the LINE OUT (L) of -10 dBV (316 mV) is obtained. Under this condition, the knob will show 2 ~ 3 o'clock position.
- Check of the stereo LINE IN jacks
Supply -10 dBV (316 mV), 1 kHz signals to the stereo LINE IN jacks on the rear panel. When the nearby variable resistor is set to maximum position, check that -10 dBV (316 mV) signals are output at the LINE OUT jacks in the standard condition.

9-2 LEVEL ADJUSTMENT OF VU METER

- Set as follows under the reference condition (-10 dBV (316 mV) is output at LINE OUT L jack).
RECORD SELECT: LEFT (TRK1, TRK3)
METER: TRK
The VU meter of TRK1 and TRK3 will indicate 0 VU.
- Set as follows under the condition of 1, step 5 (-10 dBV (316 mV) is output at LINE OUT L jack).
RECORD SELECT: RIGHT (TRK2, TRK4)
METER: TRK
The VU meter of TRK2 and TRK4 will indicate 0 VU.
- Make adjustments with a minus driver from the rear of METER PCB (Fig. 9-2).
TRK1: RX12 TRK2: RX22
TRK3: RX32 TRK4: RX42

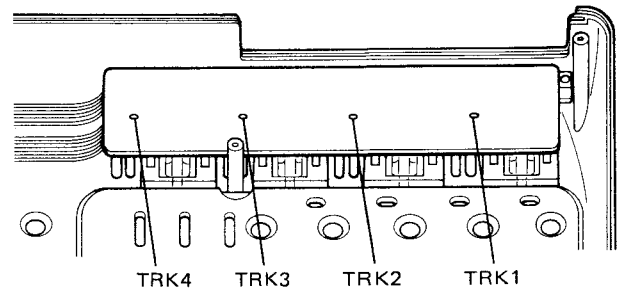


Fig. 9-2 VU Meter Adjustment

9-3 FREQUENCY RESPONSE

- MIC/LINE LINE OUT, EFFECT OUT
Check that the frequency response is in the specified range under the condition of item 1, steps 4, 5 and 6.
Specification: 40 Hz ~ 15 kHz within ± 1 dB/ -2 dB
- EFFECT RETURN ~ LINE OUT JACK
Check that the frequency response is in the specified range under the condition of item 1, step 9.
Specification: 40 Hz ~ 15 kHz within ± 1 dB/ -2 dB

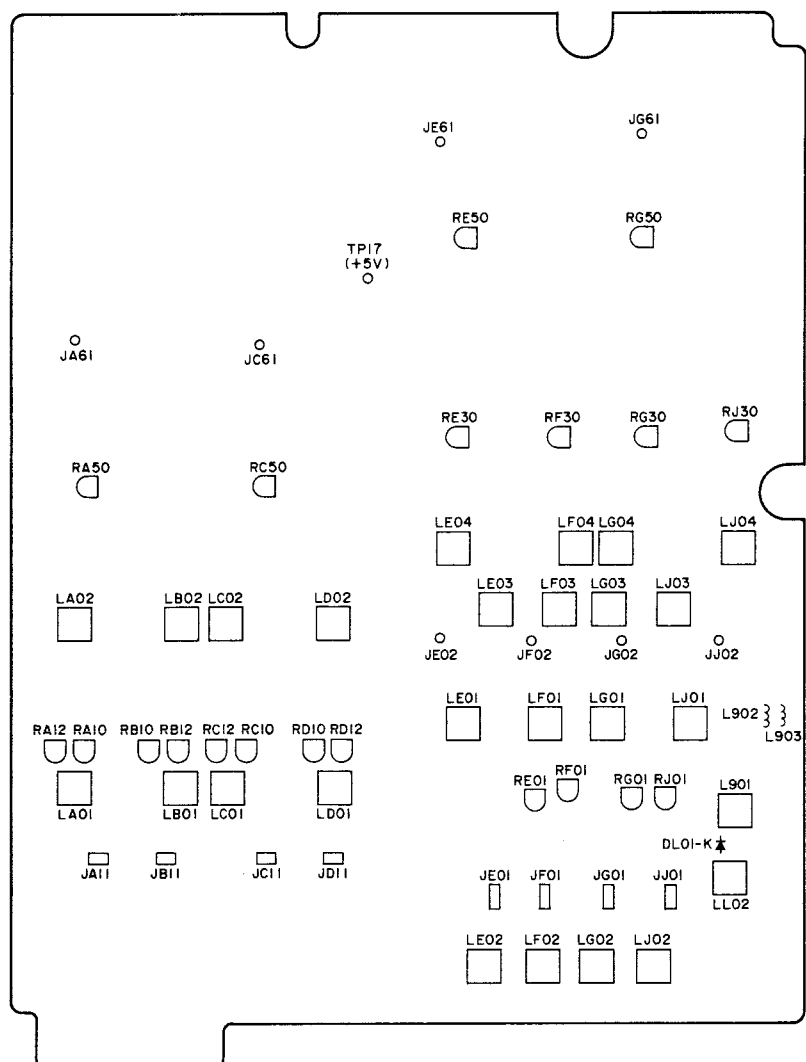
9-4 EQUALIZER RESPONSE

Under the reference condition, check that the LINE OUT level changes as follows at each frequency by turning each EQ knob.

EQ HIGH knob max., min.: ± 12 dB ± 2 dB at 10 kHz
EQ LOW knob max., min.: ± 12 dB ± 2 dB at 100 Hz
EQ MID- GAIN knob : 200 Hz ~ 5.4 kHz $\pm 12 \pm 2$ dB
SHIFT

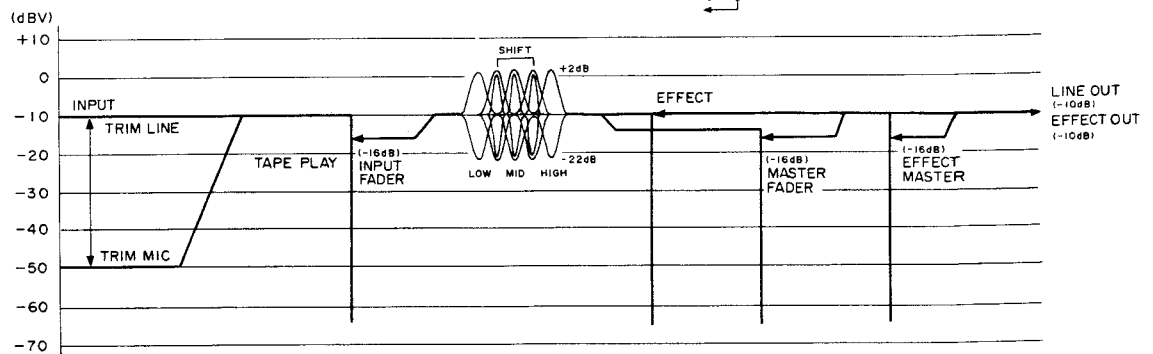
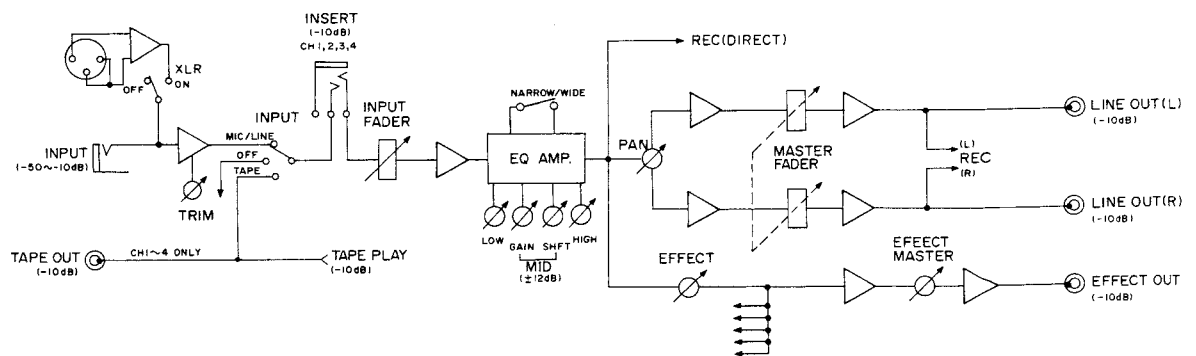
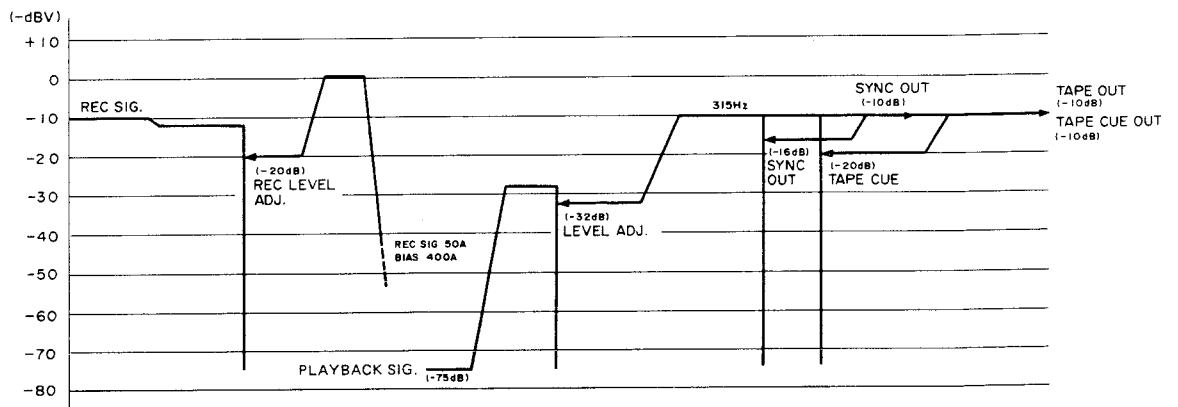
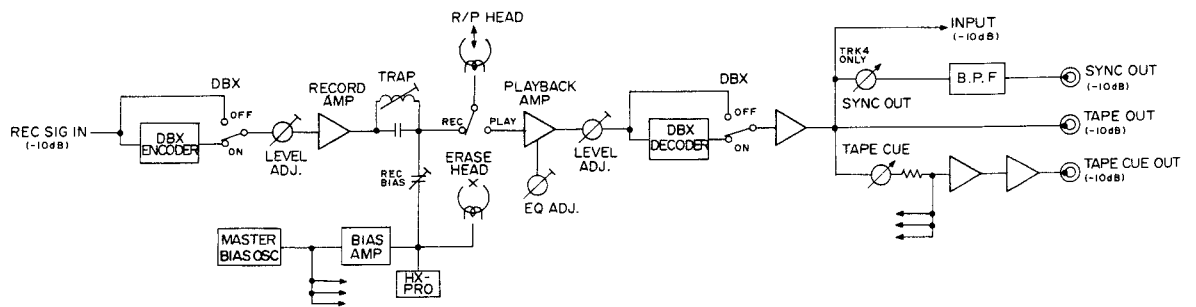
Q-FACTOR switch: The bandwidth shall vary.
OFF : Narrow Band
ON : Wide Band

ADJUSTMENT POINT COMPONENT SIDE



NO.	TRK	1	2	3	4	FUNCTION	CHECK POINT
1		RA10	RB10	RC10	RD10	PLAYBACK LEVEL CAL	TAPE-OUT
2		RA12	RB12	RC12	RD12	PLAYBACK EQ	TAPE-OUT
3		RA50		RC50		DECODE TIME	TP17 ↔ JA61/JC61
4		RE50		RG50		ENCODE TIME	TP17 ↔ JE61/JG61
5		LL02				BIAS OSC FREQUENCY	DL01-Kathod
6		L901				+/-15V DC SUPPLY	GND ↔ L903 (+15V)/L902 (-15V)
7		RE30	RF30	RG30	RJ30	REC LEVEL	TAPE-OUT
8		RE01	RF01	RG01	RJ01	BIAS LEVEL	TAPE-OUT
9		LA01	LB01	LC01	LD01	PLAYBACK BIAS TRAP	TAPE-OUT
10		LA02	LB02	LC02	LD02	PLAYBACK LPF	TAPE-OUT
11		LE01	LF01	LG01	LJ01	REC BIAS TUNING	JE01-2 ↔ JE01-1, F, G, J
12		LE02	LF02	LG02	LJ02	ERASE BIAS TUNING	JE01-2 ↔ JE01-3, F, G, J
13		LE03	LF03	LG03	LJ03	REC BIAS TRAP	JE02, JF02, JG02, JJ02
14		LE04	LF04	LG04	LJ04	REC EQ (HIGH SPEED)	TAPE-OUT

LEVEL DIAGRAM



10. RECORD/PLAYBACK AMPLIFIER CHARACTERISTICS

10-1 PLAYBACK LEVEL

- 1) Connect a level meter to the TAPE OUT jack on the side panel. Set the normal speed.
- 2) Place the DBX switch in OUT position and playback a test tape TCC-130, 400 Hz, and adjust the trim pot RA10 Fig. 00 for -7 dB (447 mV) reading on the level meter.
TAPE OUT 1: RA10 TAPE OUT 2: RB10
TAPE OUT 3: RC10 TAPE OUT 4: RD10
- 3) Under this condition, place all RECORD SELECT switch in the SAFE position and the METER switch in TRK position, and the VU meter indicates +3 VU ± 1 VU.
* Converted so that 160 Wb/m corresponds to 0 dB.

10-2 PLAYBACK FREQUENCY RESPONSE

- 1) Connect a level meter to the TAPE OUT "1" jack on the side panel.
- 2) Playback a test tape TCC-261B and reads the output level; it should be within the following limits.
Head azimuth check: The frequency response is out of the specification if the head was cleaned, adjust trim pot RA12 with the test frequency set to 10 kHz.
- 3) For the remainings, also check in the same manner. Adjustment trim pots are as follows.
TAPE OUT 1: RA12 TAPE OUT 2: RB12
TAPE OUT 3: RC12 TAPE OUT 4: RD12

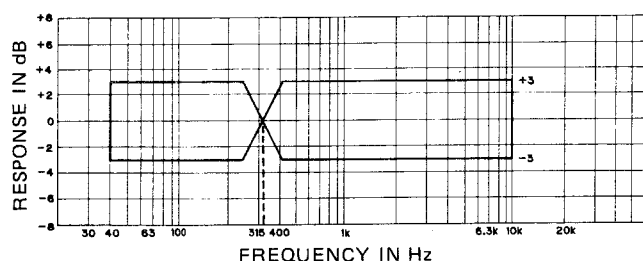


Fig. 10-2 Playback Frequency Response

10-3 DBX TIME ADJUSTMENT

The adjustment is necessary only when the DBX IC is changed.

1) Decode mode

Adjust each trim pot until the DC voltage across each resistor is 15 mV with the DBX switch set to IN and all tracks set to the PLAY mode.

TRACK	TRIM POT	REG.	CHECK POINT
1/2	RA50	RA61	JA61 \leftrightarrow TP17
3/4	RC50	RC61	JC61 \leftrightarrow TP17

2) Encode mode

Set the DBX switch to IN and load a blank tape. Set the mode to REC-PAUSE with the RECORD SELECT switches of all tracks to the DIRECT side.
Adjust each trim pot until the DC voltage across each resistor is (15 mV).

TRACK	TRIM POT	REG.	CHECK POINT
1/2	RE50	RE61	JE61 \leftrightarrow TP17
3/4	RG50	RG61	JG61 \leftrightarrow TP17

10-4 BIAS OSC FREQUENCY

Readjust the bias OSC frequency when the master oscillator OSC Trance (LL02) is changed.

Set the mode to REC-PAUSE with a blank tape loaded. Adjust LL02 until the bias OSC frequency is 80 kHz ± 0.5 kHz at the output side (diode DL01 cathode terminal) of the oscillator (LL02).

10-5 BIAS TUNING OF BIAS AMP

Make the tuning when the master OSC trance or the erase head is changed.

Set the all tracks to the REC-PAUSE mode and adjust each bias amp. Until the DC voltage across each resistor is minimum (less than 25 mV).

TRACK	COIL	REG.	CHECK POINT
1	LE01	RE04	JE01-1 \leftrightarrow 2
2	LF01	RF04	JF01-1 \leftrightarrow 2
3	LG01	RG04	JG01-1 \leftrightarrow 2
4	LJ01	RJ04	JJ01-1 \leftrightarrow 2

10-6 BIAS TRAP OF PLAYBACK AMP

Proceed the tuning when the oscillator trance (LL02) is changed.

Set the track to be adjusted to the PLAY mode and the adjacent track to the REC-PAUSE mode. Adjust the bias trap until the amp. output terminal voltage (bias leakage) of the track to be adjusted is minimum.

TRACK	COIL	CHECK POINT
1	LA01	TAPE OUT 1
2	LB01	TAPE OUT 2
3	LC01	TAPE OUT 3
4	LD01	TAPE OUT 4

10-7-(1) Bias trap

Make the adjustment when the oscillator trance (LL02) is changed.

Set the all tracks to the REC-PAUSE mode and adjust each bias amp. Until the bias leakage voltage of each resistor terminal is minimum.

TRACK	COIL	REG.	CHECK POINT
1	LE03	RE11	JE02
2	LF03	RF11	JF02
3	LG03	RG11	JG02
4	LJ03	RJ11	JJ02

10-7-(2) Erasure bias voltage adjustment

This should be re-adjusted after having replaced the master oscillator (LL02) or the erase head.

With all tracks in the REC-PAUSE mode, adjust the erase transformer to minimize the DC voltages across the resistors listed below. (0.65V)

TRACK	TRANCE	REG.	CHECK POINT
1	LE02	RE05	JE01-3 \leftrightarrow 2
2	LF02	RF05	JF01-3 \leftrightarrow 2
3	LG02	RG05	JG01-3 \leftrightarrow 2
4	LJ02	RJ05	JJ01-3 \leftrightarrow 2

10-7-(3) Reproduce LPF adjustment

This should be re-adjusted after having replaced the master oscillator (LL02) or the erase head.

With all tracks in the REC-PAUSE mode, adjust the coil to minimize the bias leakage current output at TAPE OUT.

TRACK	COIL	CHECK POINT
1	LA02	TAPE OUT 1
2	LB02	TAPE OUT 2
3	LC02	TAPE OUT 3
4	LD02	TAPE OUT 4

10-8 BIAS VOLTAGE SETTING

- 1) Set the input fader and the knob to the reference positions as mentioned under the section 9.
- 2) Connect an audio oscillator to the MIC/LINE (1) jack and a level meter to the TAPE OUT (1) jack. Set the RECORD SELECT switch to be adjusted to the DIRECT side and load a blank tape AC-513 (or TCC-203B).
- 3) Connect an AC voltmeter across pins 1 and 2 of JA11, set semi-fixed resistor RE01 to the minimum position, and turn it gradually clockwise until the saturated point. Ensure that the voltage at the saturated point is $3.5 \text{ mV} \pm 0.5 \text{ mV}$.
- 4) Adjust for the remaining tracks in the same way.

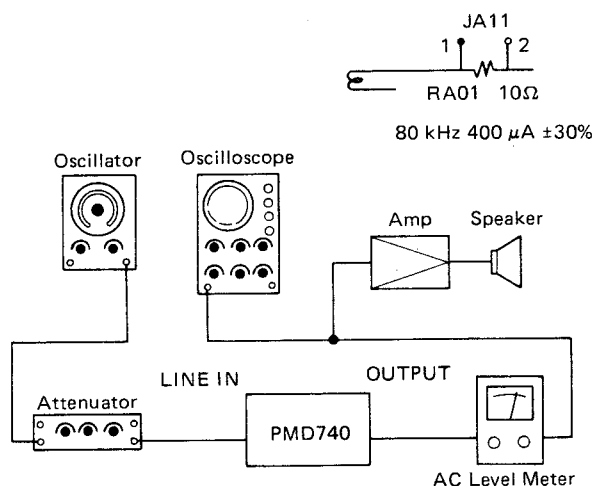


Fig. 10-8 Bias Voltage Measurement

10-9 RECORD LEVEL

- 1) Set the input faders and the knobs to the reference positions as mentioned under the section 9.
- 2) Connect an oscillator to the MIC/LINE (1) jack and a level meter to the TAPE OUT (1) jack. Set the RECORD SELECT switch to be adjusted to the DIRECT side and load a blank tape AC-513 (or TCC-203B).
- 3) Record the reference level input signal 400 Hz, -10 dBV (316 mV) on the TRK1. Play back the signal and adjust RE30 until the TAPE OUT level is the reference level -10 dBV (316 mV).
- 4) For the remaining tracks, adjust the recording level in the same way.

TRK1: RE30 TRK2: RF30
TRK3: RG30 TRK4: RJ30

10-10 OVERALL FREQUENCY RESPONSE

- 1) Connect the test equipments as mentioned under the steps 1 and 2 of "9-9 RECORD LEVEL".
 - 2) Decrease the input signal level by 20 dB from the reference level and set the level to -30 dBV (3.16 mV). Set the tape speed to high speed (9.5 cm/sec).
 - 3) Vary the input signal frequency over a range of 40 Hz to 10 kHz and record the frequencies, and then playback the signals just recorded. The playback output levels should be as shown in Fig. 10-10.
- * If the output reading is out of the limits, check the playback frequency again. If the playback response is correct try to readjust the bias voltage as mentioned in 9-8. When the output level is lower than the limit, decrease the bias level slightly, and when higher increase the bias slightly. However, recording distortion may increase the bias voltage is lowered excessively, so make sure the distortion is within the limit, less than 2.5% at 400 Hz at the reference record level.
- 4) Set the tapespeed to normal speed (4.76 cm/sec), and perform the same checking as 3).

NOTE: Varying the bias voltage may upset the recording level adjustment, so always make sure the recording level and readjust the level again as necessary by referring to the section 10-9.

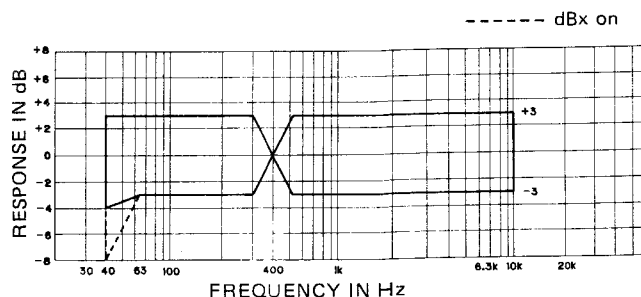


Fig. 10-10 Overall Frequency Response

10-11 OVERALL DISTORTION

- 1) Set and adjust the test setup as mentioned under the steps 1 and 2 of "10-9 RECORD LEVEL".
- 2) Vary the frequency of the reference input signal to 400 Hz, and record and play back the frequency. Measure the distortion; it should be less than 2.5%.

If out of limits:

- * Readjust the bias voltage. Reference bias current is about $350 \mu\text{A}$.
- * Try to erase the erase and record/playback heads, or replace the head(s).
- * Check for overall S/N.

10-12 OVERALL SN RATIO

- 1) Set and adjust the test set-up as mentioned under the steps 1 and 2 of "10-9 RECORD LEVEL".
- 2) Record the reference input signal 400 Hz, and then remove the input plug and continue the recording with no signal applied.
- 3) Playback both the reference signal and no signal just recorded and read the level difference between the outputs. The difference (SN) should be higher than 43 dB for each track, when measured through a 20 Hz to 20 kHz filter.

10-13 ERASING RATIO

- 1) Connect test equipments as shown in Fig. 10-13 and adjust the controls and switches as mentioned under the steps 1 and 2 of "10-9 RECORD LEVEL".
- 2) Adjust the signal generator to provide 1 kHz, 0 dBV and record it. Playback the signal just recorded and read and note the output level.
- 3) Rewound the tape up to the beginning of the tape just recorded. Remove the plug from the MIC/LINE jack and then record no signal on the tape just recorded with the 1 kHz signal.
- 4) Rewound the tape just recorded with no signal and playback it. Read the output level with the level meter sensitivity increased.

Compare the output levels obtained in the steps 2 and 4; the level difference should be higher than 65 dB for each channel. Reference: Current consumption more than 30 mA

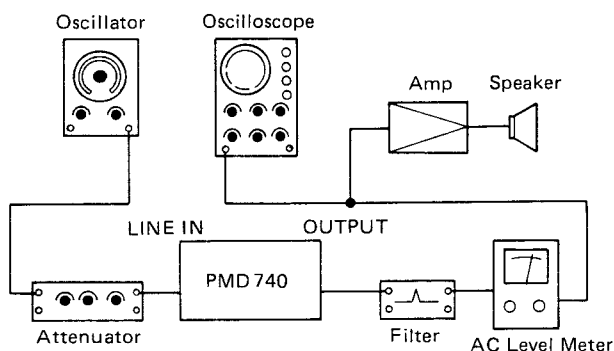


Fig. 10-13 Erasing Ratio Measurement

10-14 CROSSTALK BETWEEN CHANNELS

- 1) Set and adjust the test equipment as mentioned under the steps 1 and 2 of "10-9 RECORD LEVEL".
 - 2) Record the reference signal of 1 kHz, -10 dBV (316 mV) on the TRK1. Rewound the tape just recorded and playback it. Measure the leakage output levels to the adjacent channels through a 1 kHz filter, and measure ratio(s) against the reference level.
- The ratio should be higher than 45 dB for each channel.

10-15 SYNC CROSSTALK

This refers to the crosstalk between adjacent tracks when a SYNC recording is made. In other words, it refers to the degree of the bias signal leakage into adjacent tracks from a recording track.

Set each track as mentioned under "10-9 RECORD LEVEL".

• Crosstalk between Track #1 and #2

- 1) Place the RECORD SELECT TRK1 switch in the "ON", and TRK2 switch in the "SAFE" positions.
- 2) Measure the output at the TAPE OUT 2 jack with the TRK "1" set to record mode and the TRK 2 to playback mode.
- 3) Change the input signal frequency to 10 kHz and check how much of the signal applied to the TRK "1" leaks into the TRK2, or read the level difference against the reference level. The difference should be less than 0 dB at 10 kHz.

• Crosstalk between Other Tracks

- 1) The same method used for measuring crosstalk between TRK1 and TRK2 is used. When measuring crosstalk between other tracks, the RECORD SELECT switch should be set as below. Number in parenthesis indicates the setting from the opposite channel.

Setting or RECORD SELECT switch

Combination	Record Track	Playback Track
Between tracks #1 and #2	TRK1	SAFE 2
	(TRK2)	(SAFE 1)
Between tracks #2 and #3	TRK2	SAFE 3
	(TRK3)	(SAFE 2)
Between tracks #3 and #4	TRK3	SAFE 4
	(TRK4)	(SAFE 3)

10-16 SYNC SIGNAL R/P

The TRK4 is exclusively used for recording and reproducing of the SYNC signal.

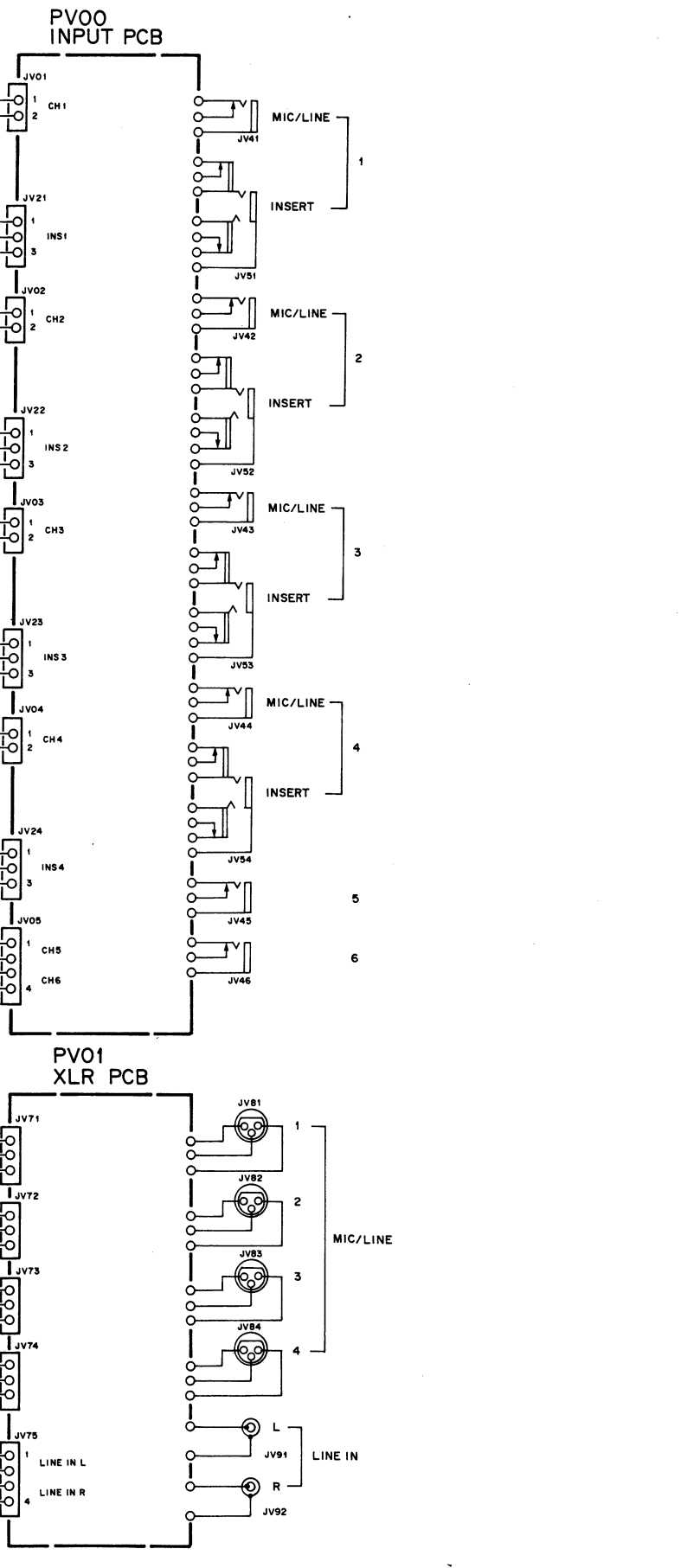
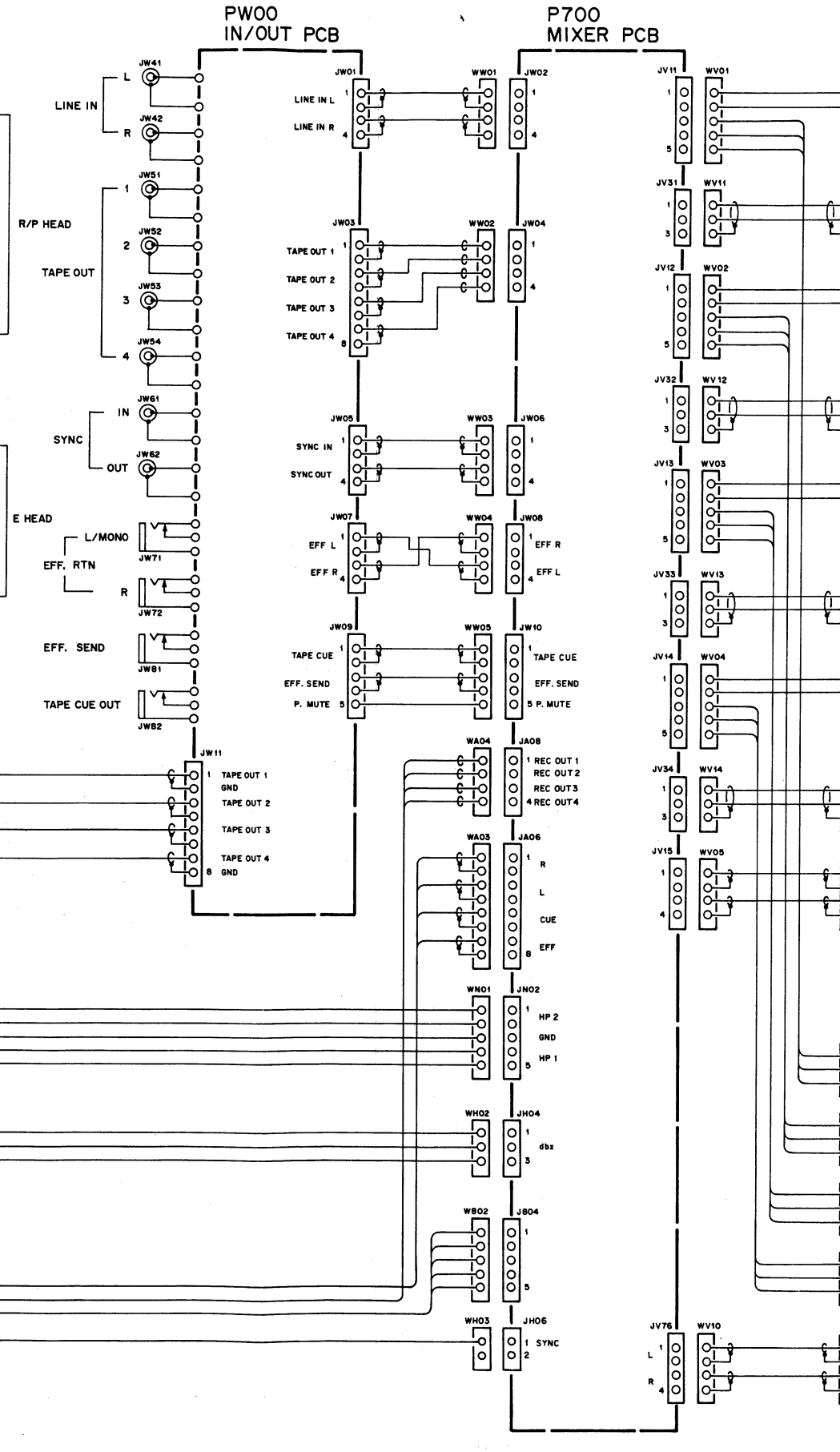
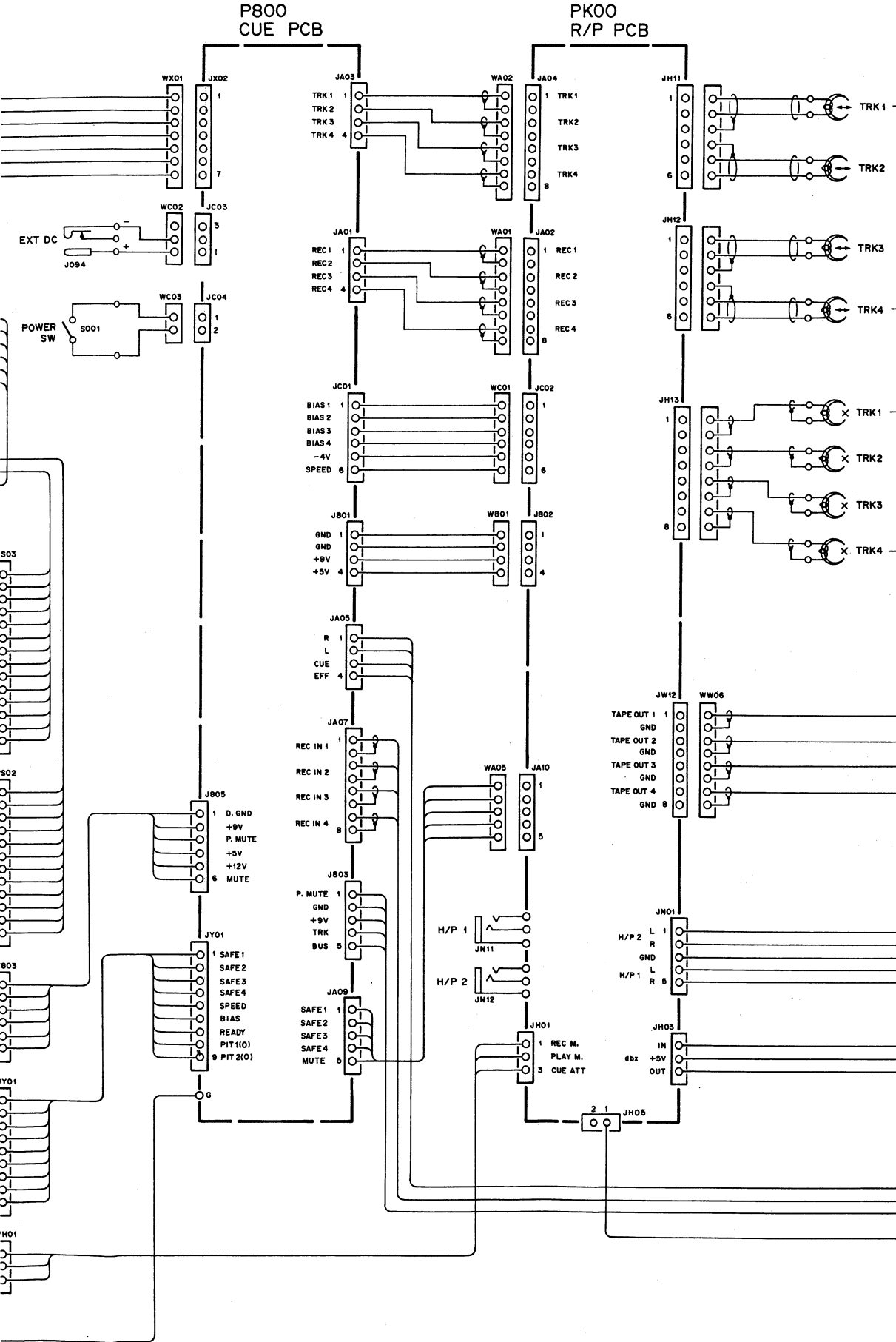
The input signal is applied to the SYNC IN terminals instead of the MIC/LINE terminals. In the same way the SYNC OUT terminals are used instead of TAPE OUT 4 when reproducing.

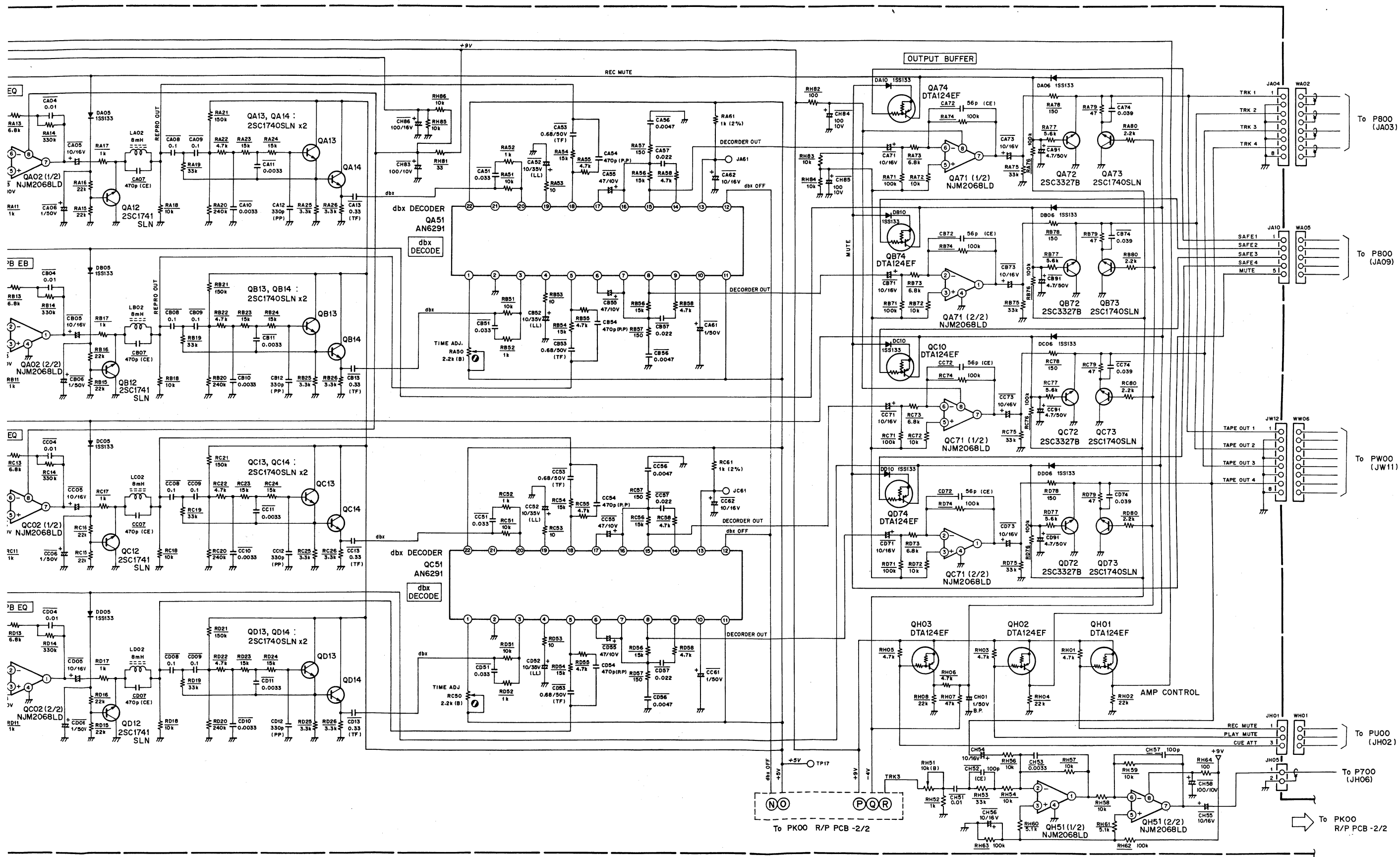
- 1) Apply the SYNC reference input signal of -10 dB (316 mV) to the SYNC IN terminals.
- 2) Set the SYNC switch to ON, and then place the RECORD SELECT switch for TRK4 in the DIRECT position. Record signals on the TRK4.
- 3) Set the SYNC knob to its max. position and read the output level at the SYNC OUT terminals.

It should be about -4 dBV.

Reference: The overall frequency response is ± 3 dB at 300 Hz \sim 3 kHz.

4





QJ11 QLO1 QJ31 Q901
QE31 QE11~QG01 QG31 QF31
QH01~QH03 QA01~QD01 QA03~QD03 QA11~QD11

QC02 QG01
QA02 QE01

QJ12 QH21
QA12~QD12

QG02 QE12~QG12 QE13~QG13 QJ13 QJ14 QJ15 QH11 QG03
QE02 QE14~QG14 QE15~QG15 QE03
QA13~QD13 QA14~QD14 QA51

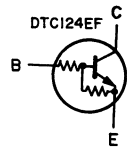
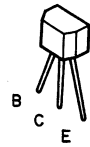
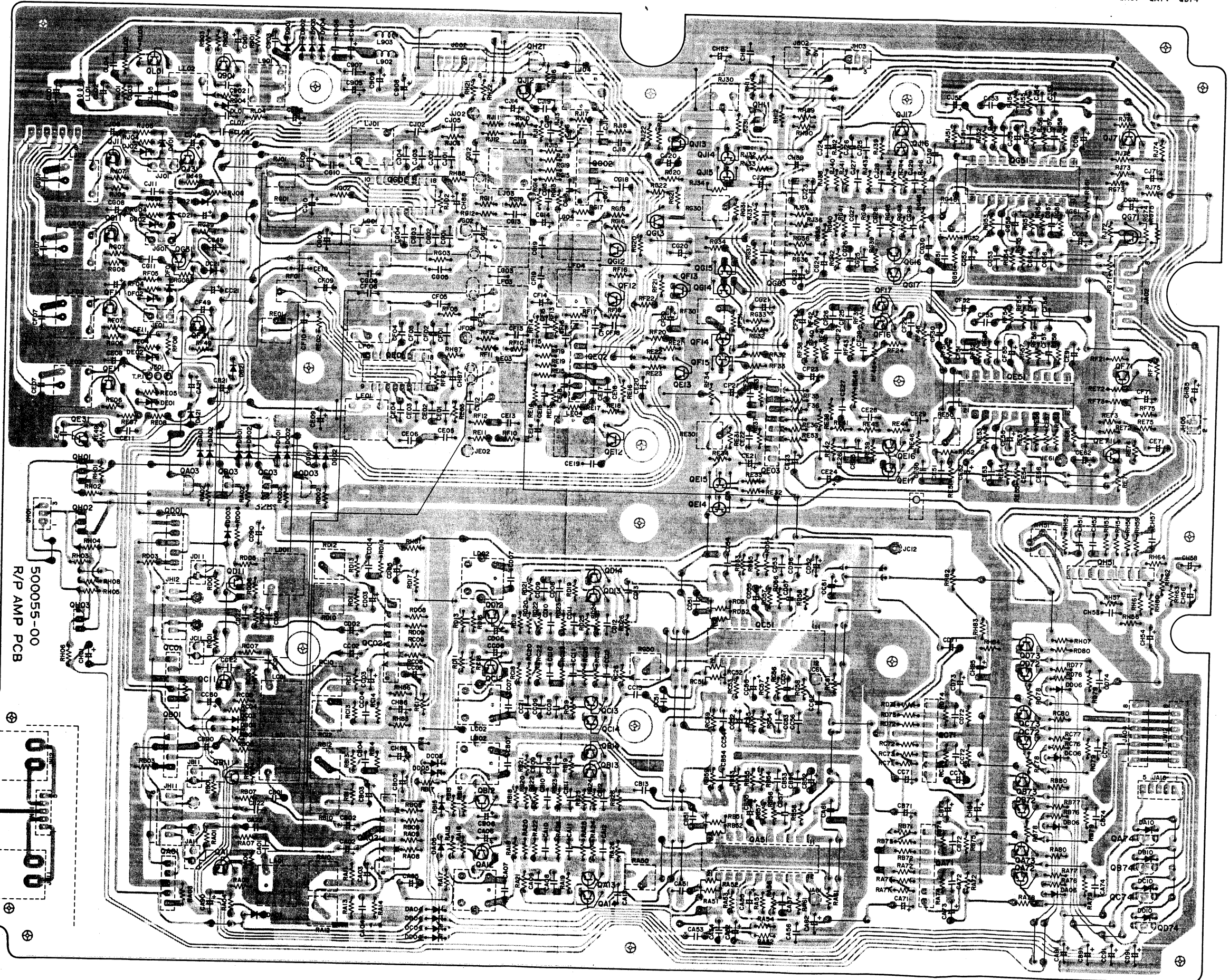
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QE17~QG17 QJ17

QA71

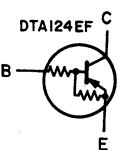
QG51
QE51

QE71~QG71 QJ71
QA72~QD72 QA73~QD73 QH51 QA74~QD74

PK00 REC/PLAY AMP PCB

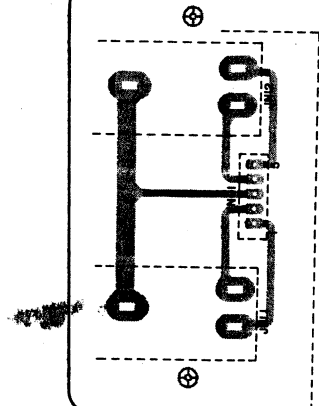


QA03 QB03
QC03 QD03
QH11 QH21



QH01~QH03
QD74

500055-00
R/P AMP PCB



QJ11 QLO1 QJ31 Q901
QE31 QE11~Q601 QG31 QF31
QHO1~QH03 QAO1~QD01 QAO3~QD03 QAI1~QD11

QC02 QG01
QA02 QE01

QJ12 QH21
QAI2~QD12

QG02 QE12~QG12 QE13~QG13 QJ13 QJ14 QJ15 QH11 QG03
QE02 QE14~QG14 QE15~QG15 QE03
QAI3~QD13 QAI4~QD14 QA51

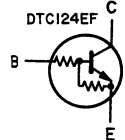
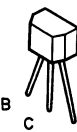
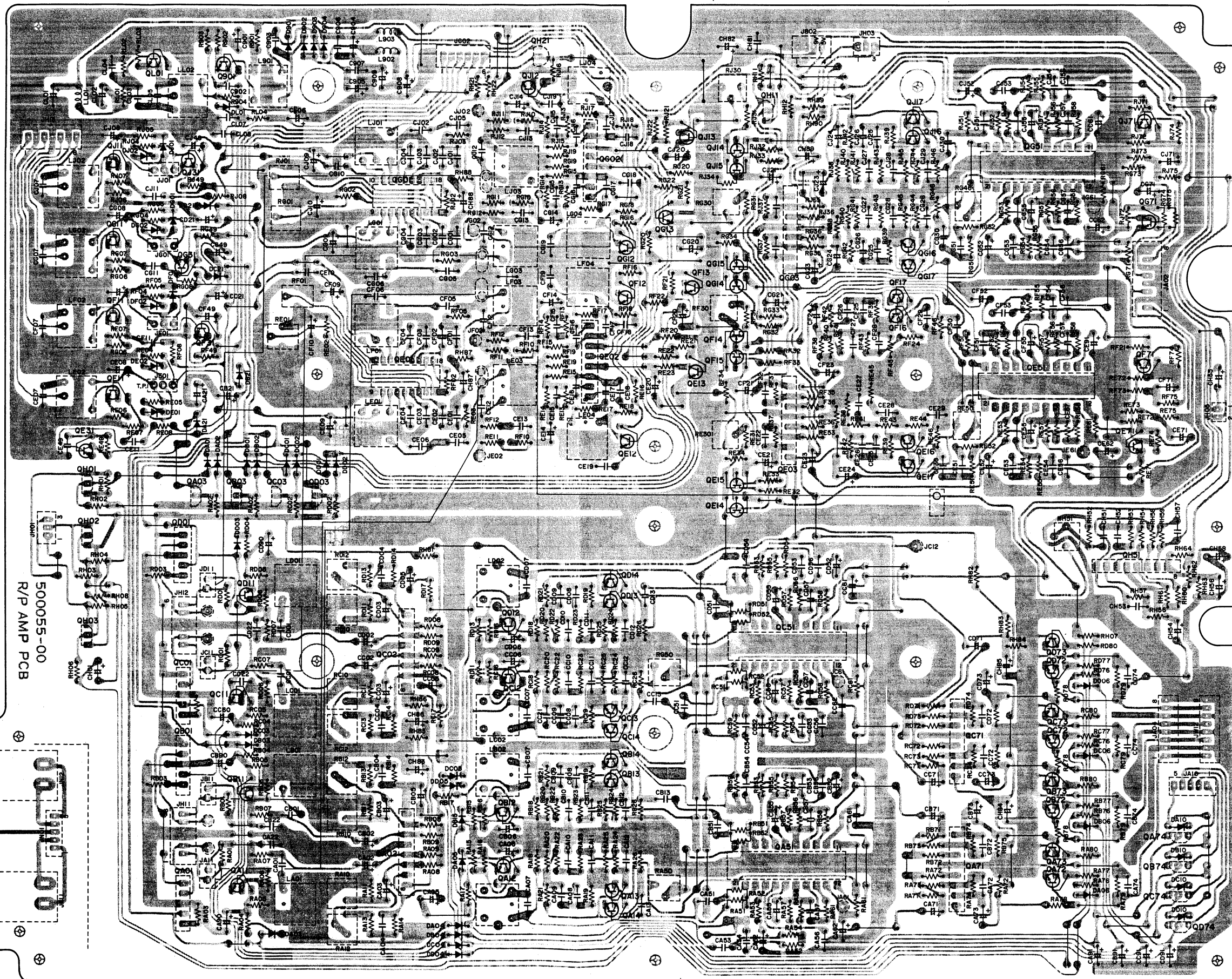
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QE17~QG17 QJ17

QA71

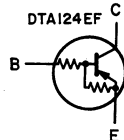
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QE51

QE71~QG71 QJ71
QA72~QD72 QA73~QD73 QH51 QA74~QD74

PK00 REC/PLAY AMP PCB

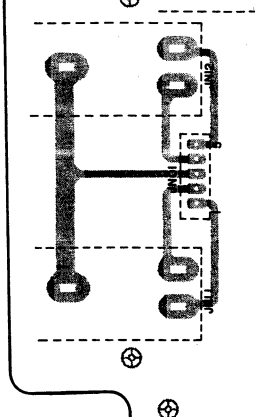


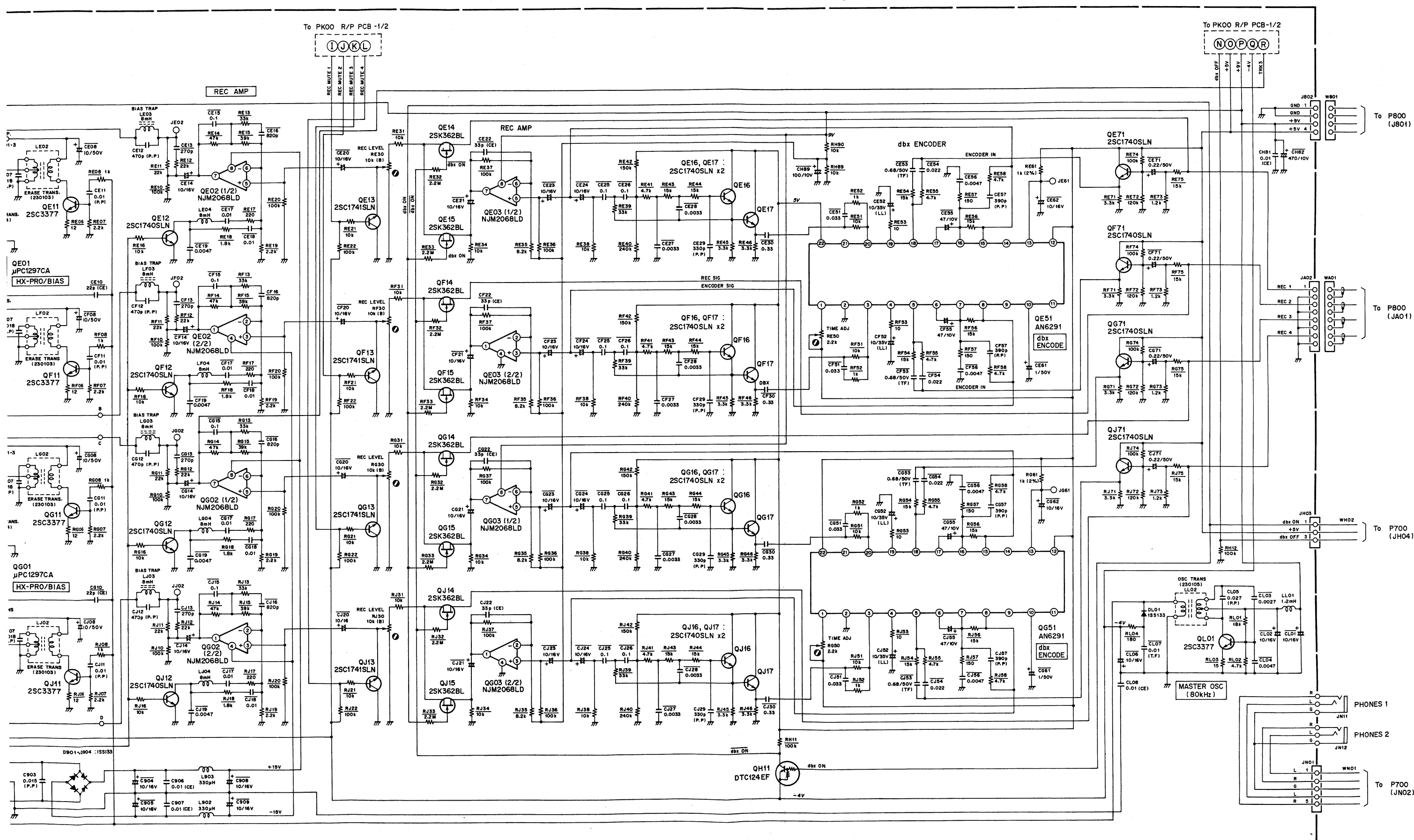
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QH11 QH21

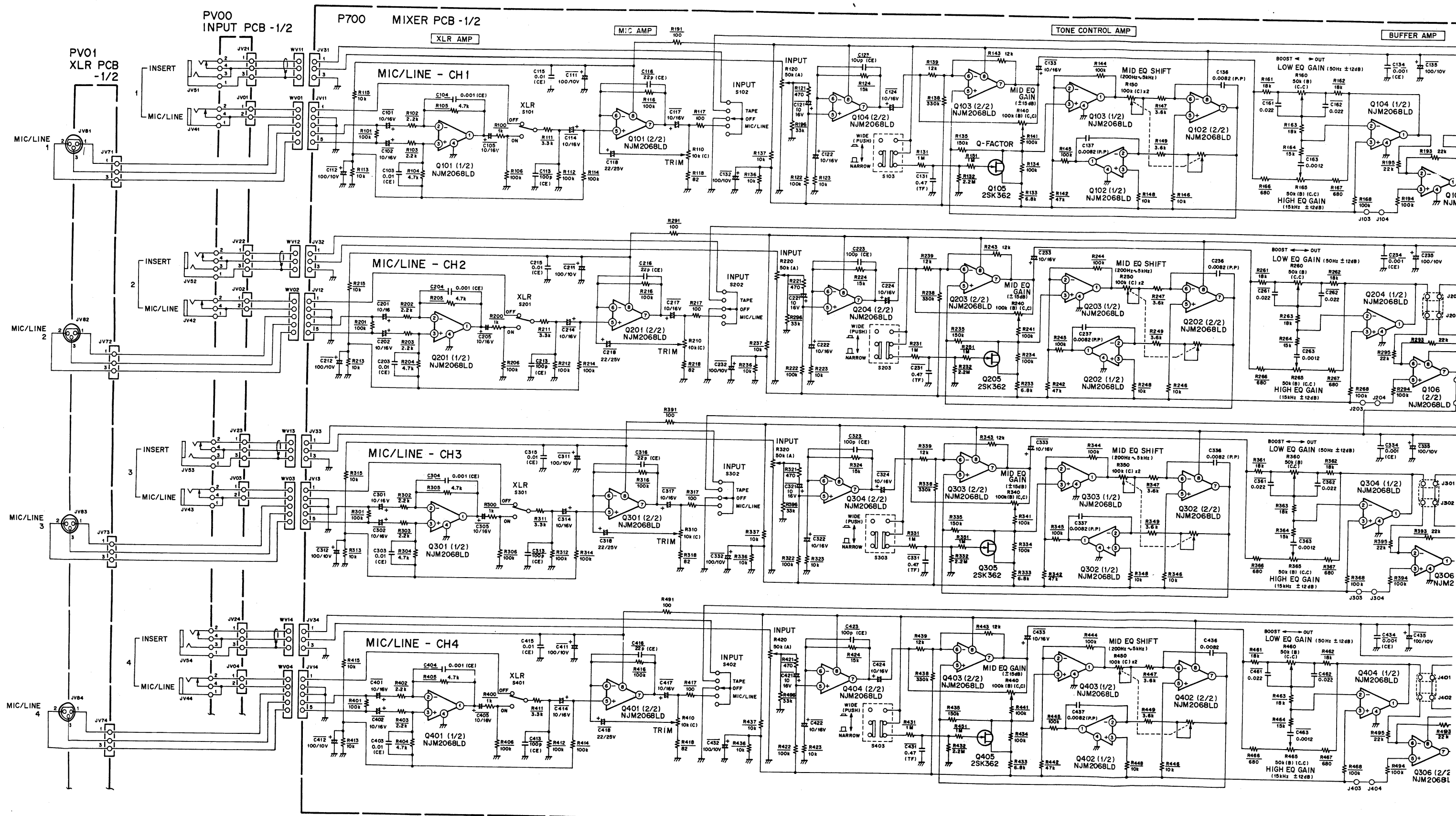


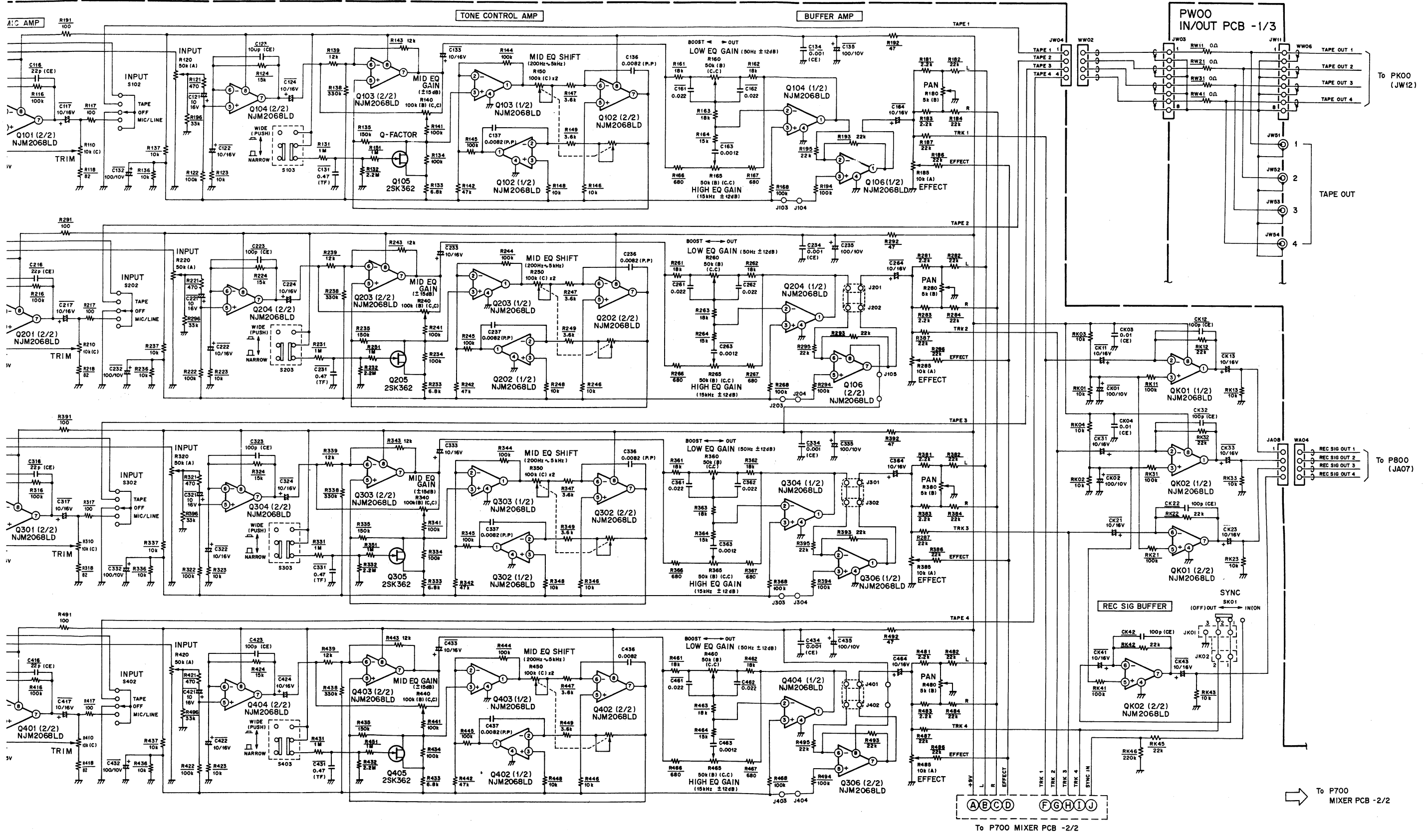
QHO1~QH03
QD74

500055-00
R/P AMP PCB









P700 MIXER PCB

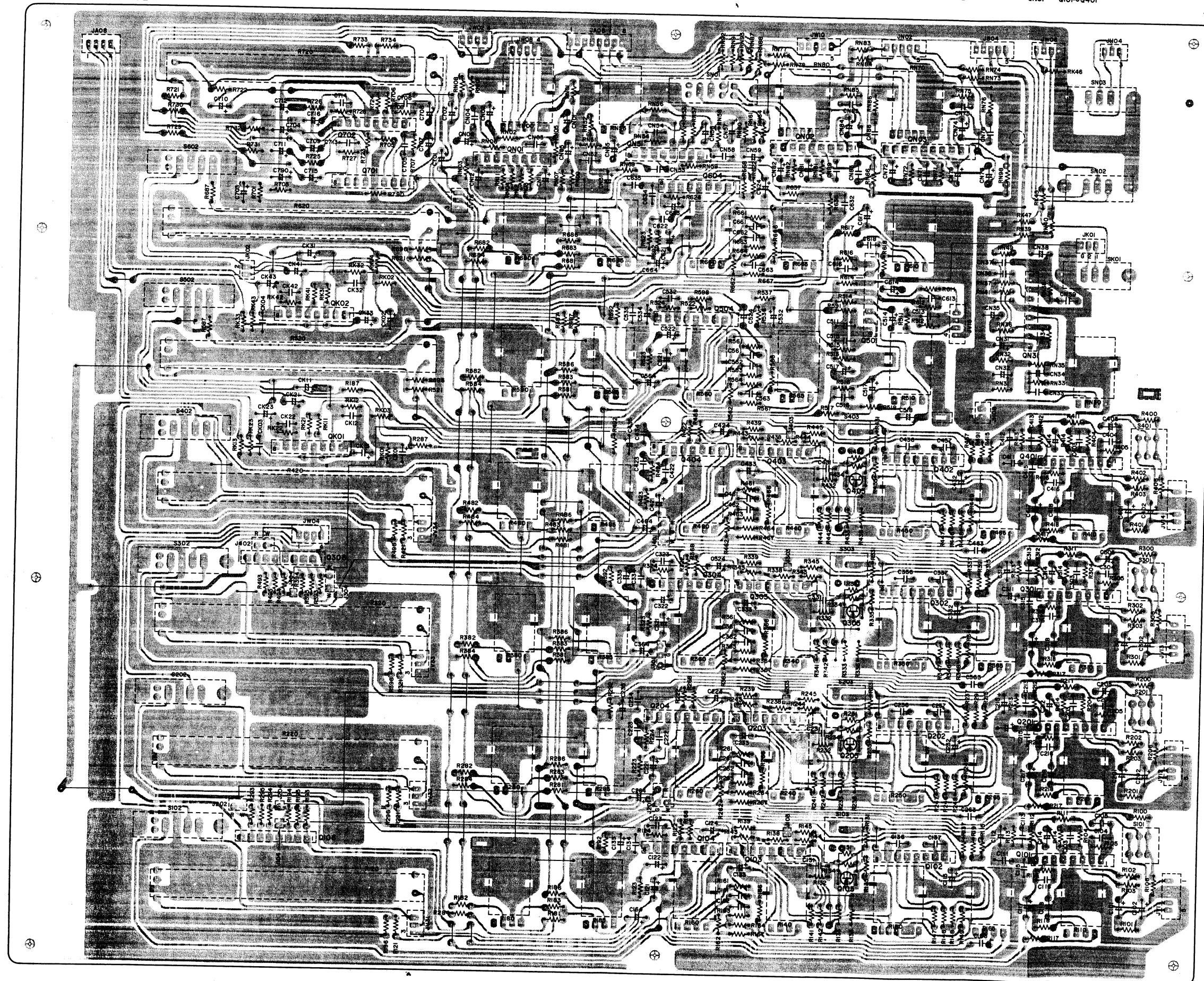
QK02 QK01 Q702 Q701 Q306 Q106

QK01

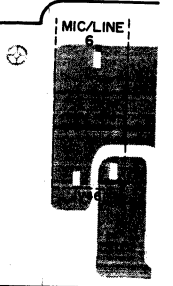
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Q103~Q403 QK02 Q105~Q405 Q501 QK03 Q102~Q402

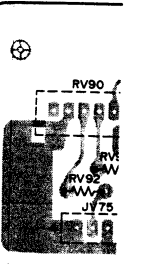
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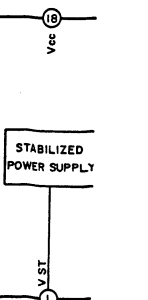
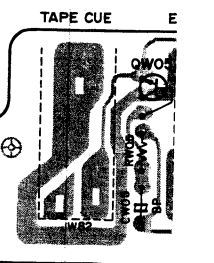
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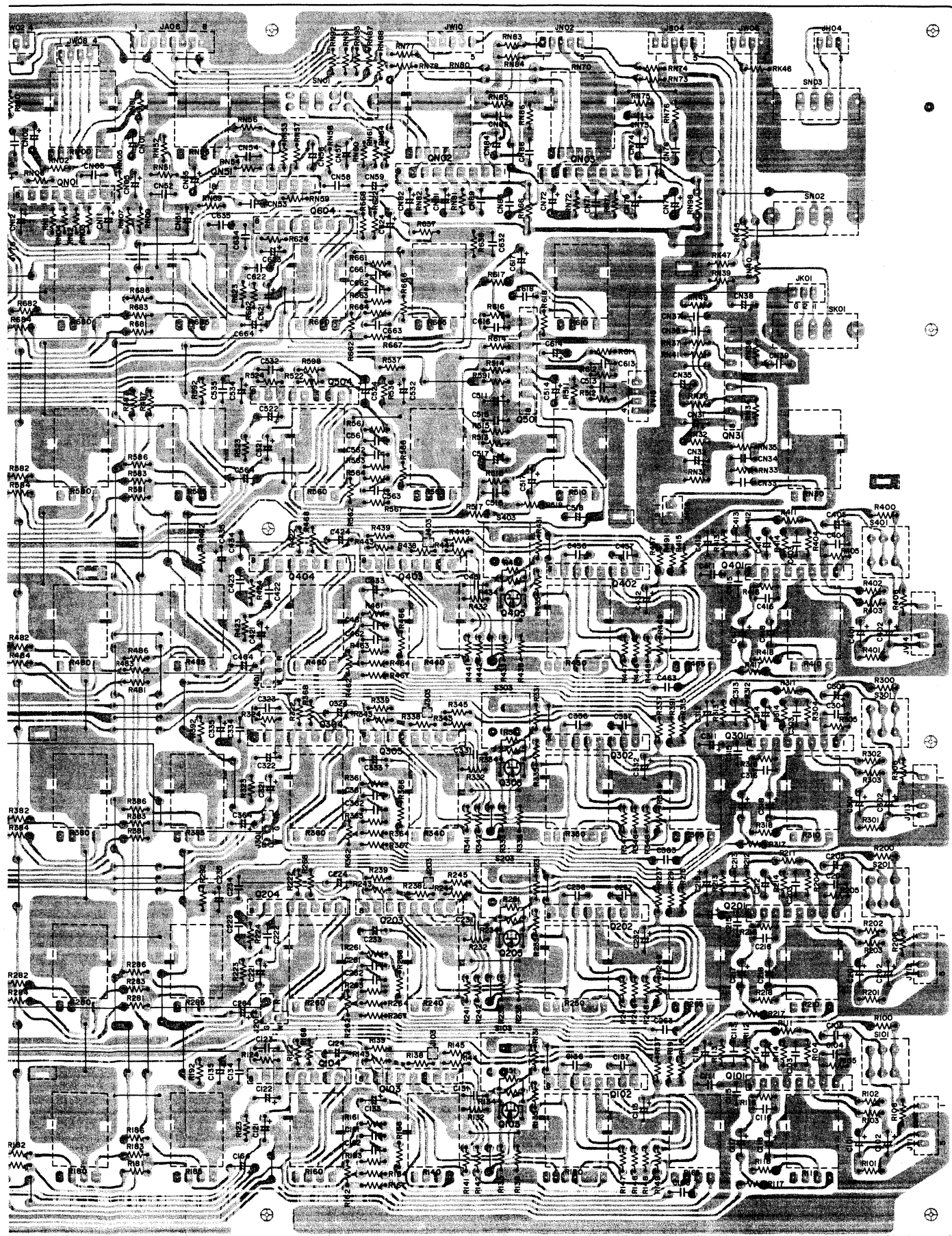


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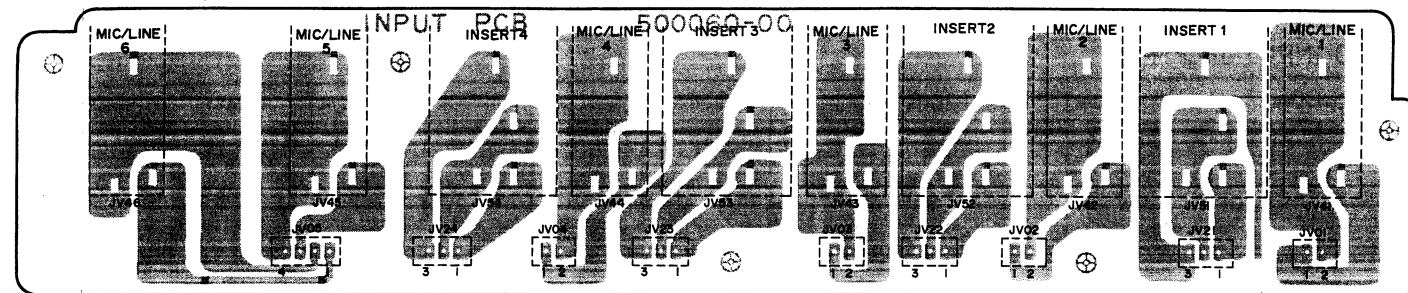


QW05 PW00 INPUT /

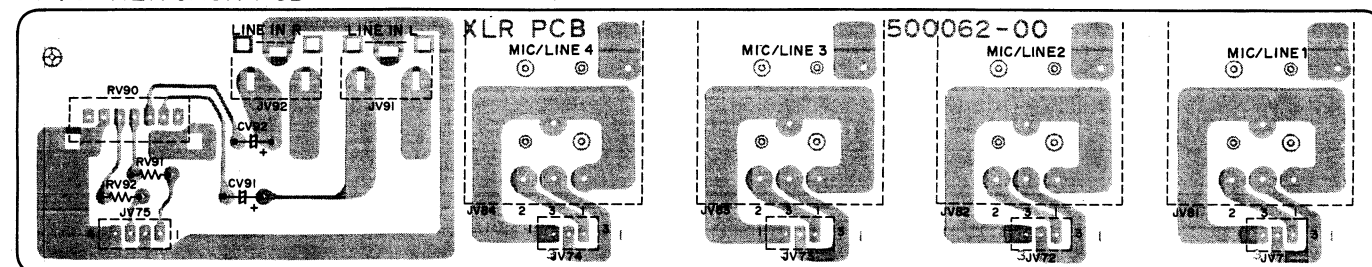




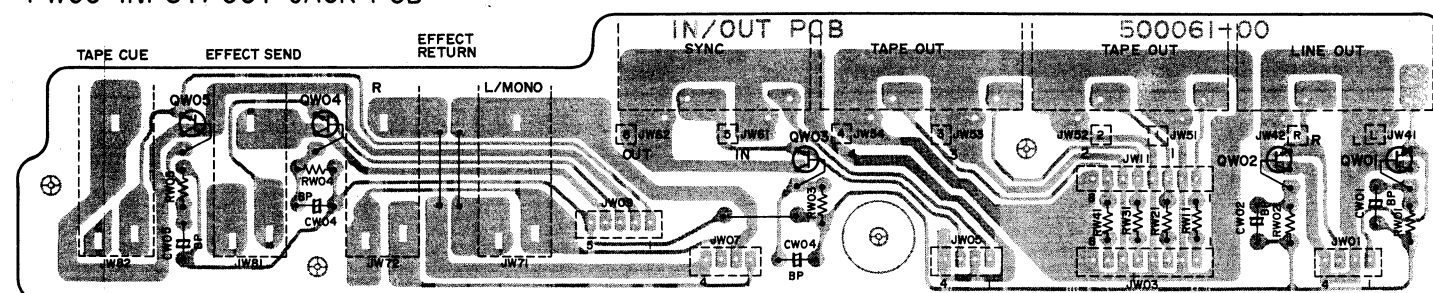
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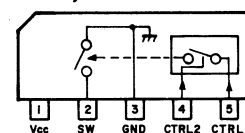
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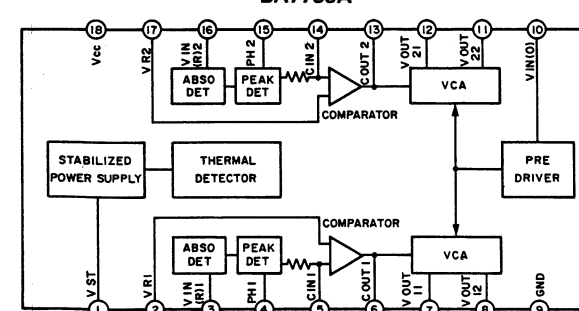
PW00 INPUT/OUT JACK PCB



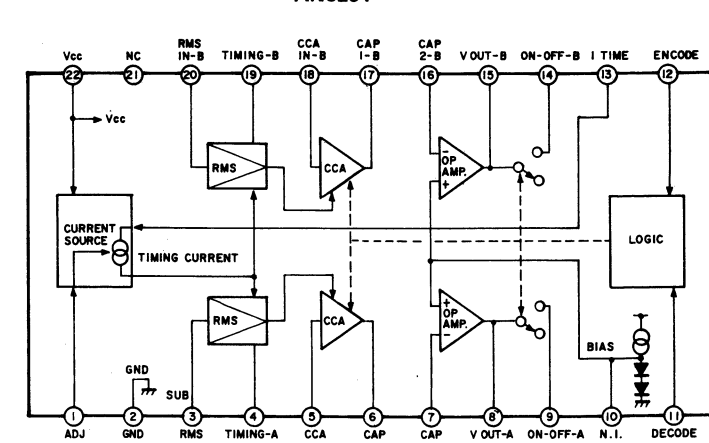
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BA7755A



AN6291



P700 MIXER PCB

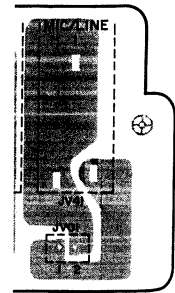
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QK01

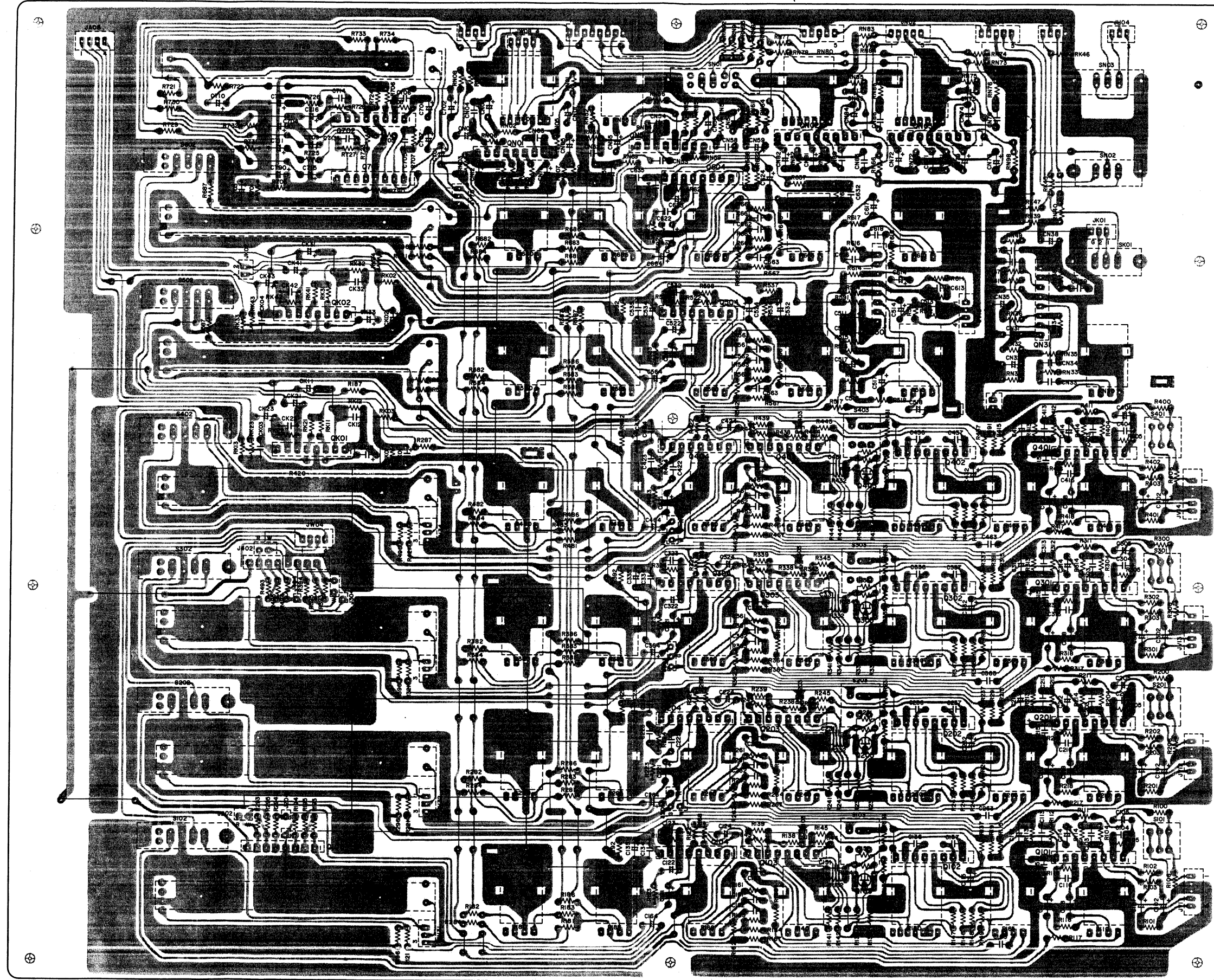
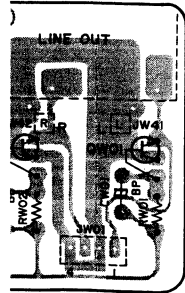
QK01 Q104~Q604

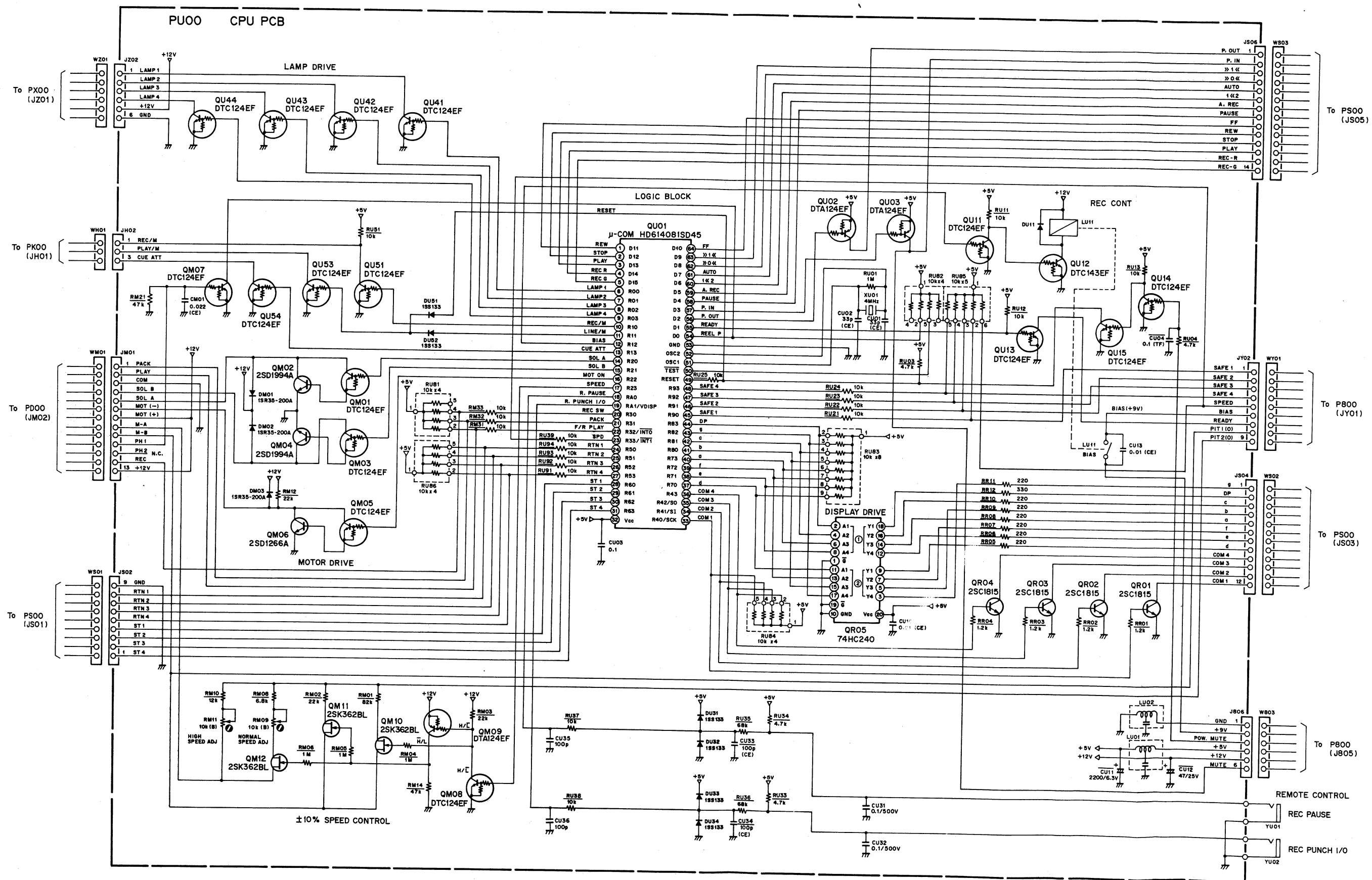
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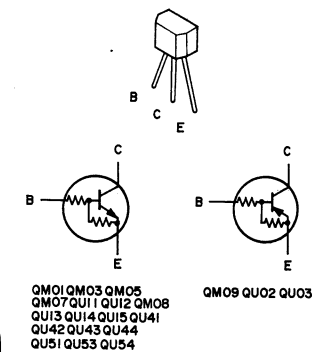
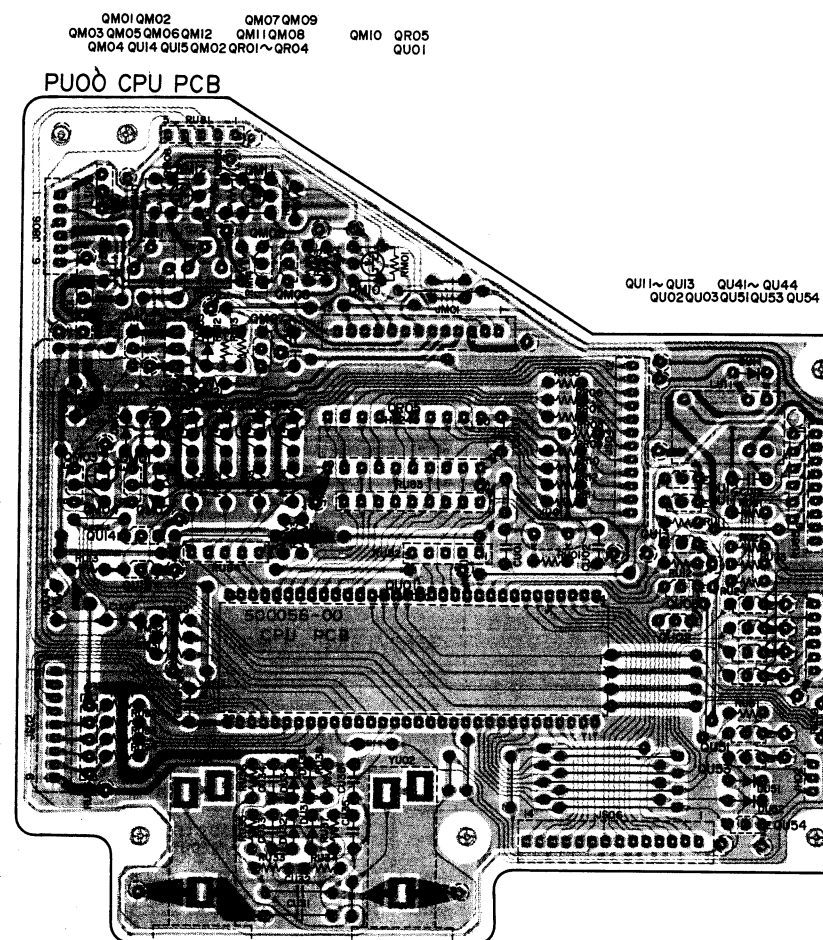
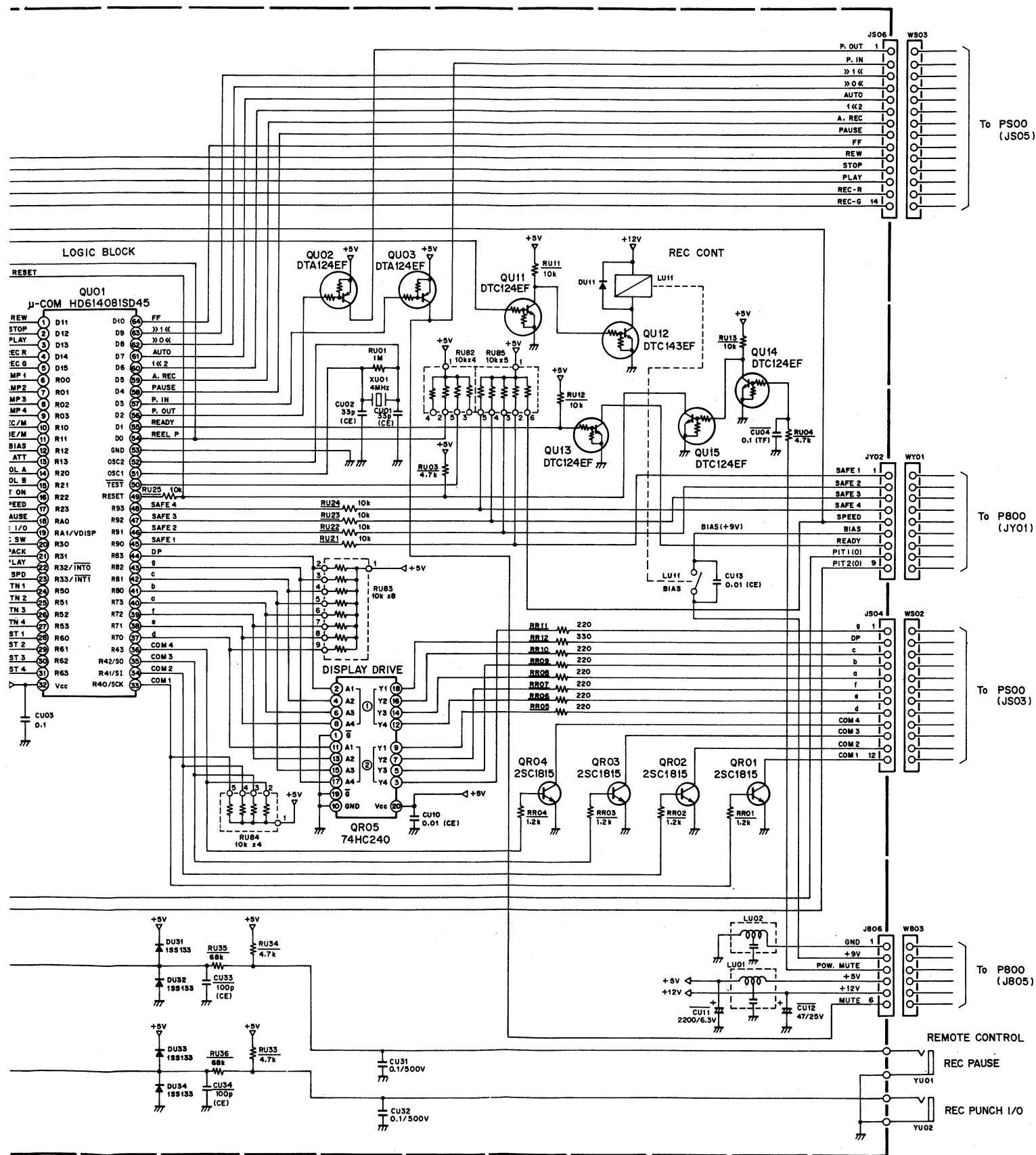
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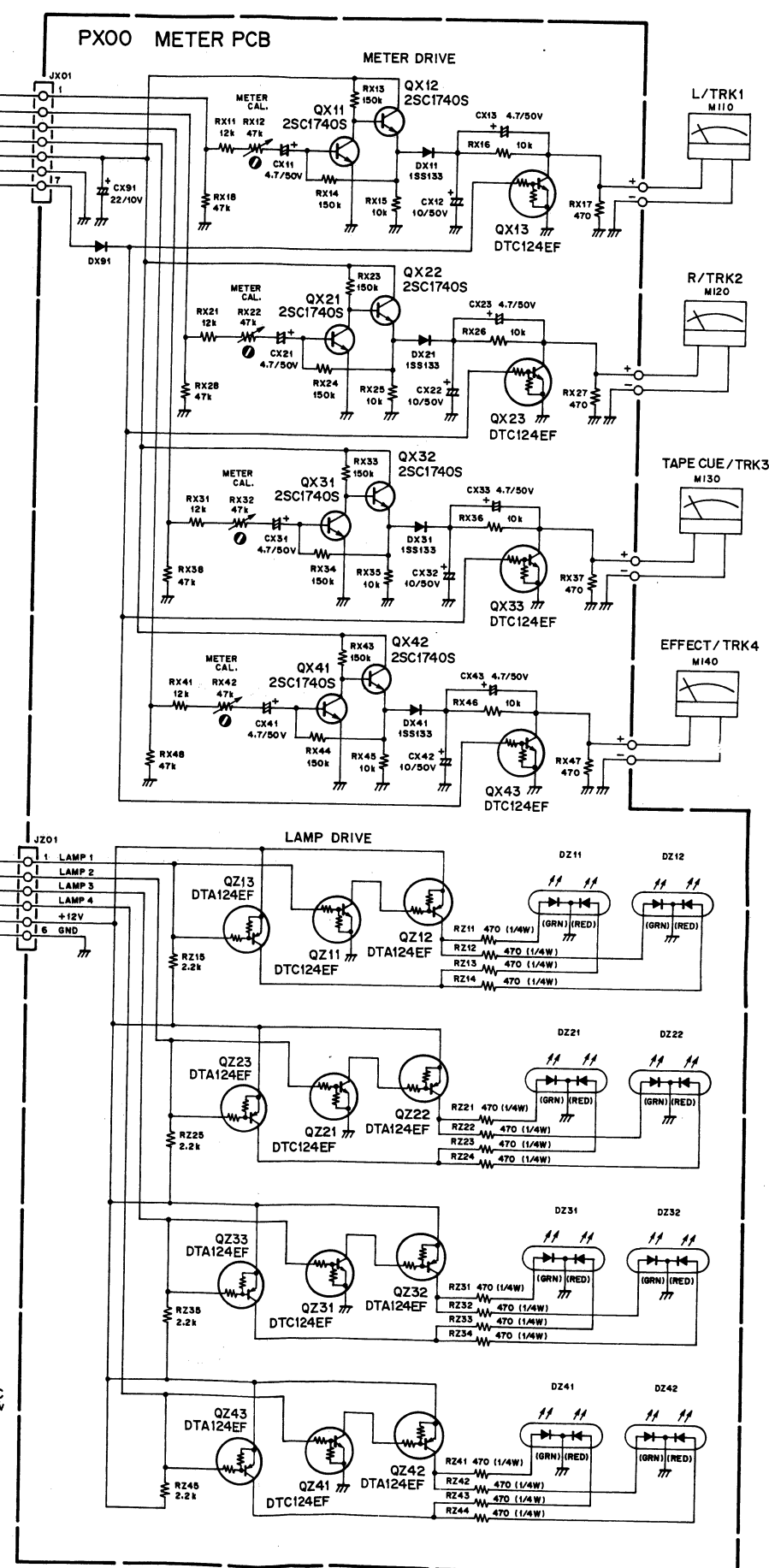
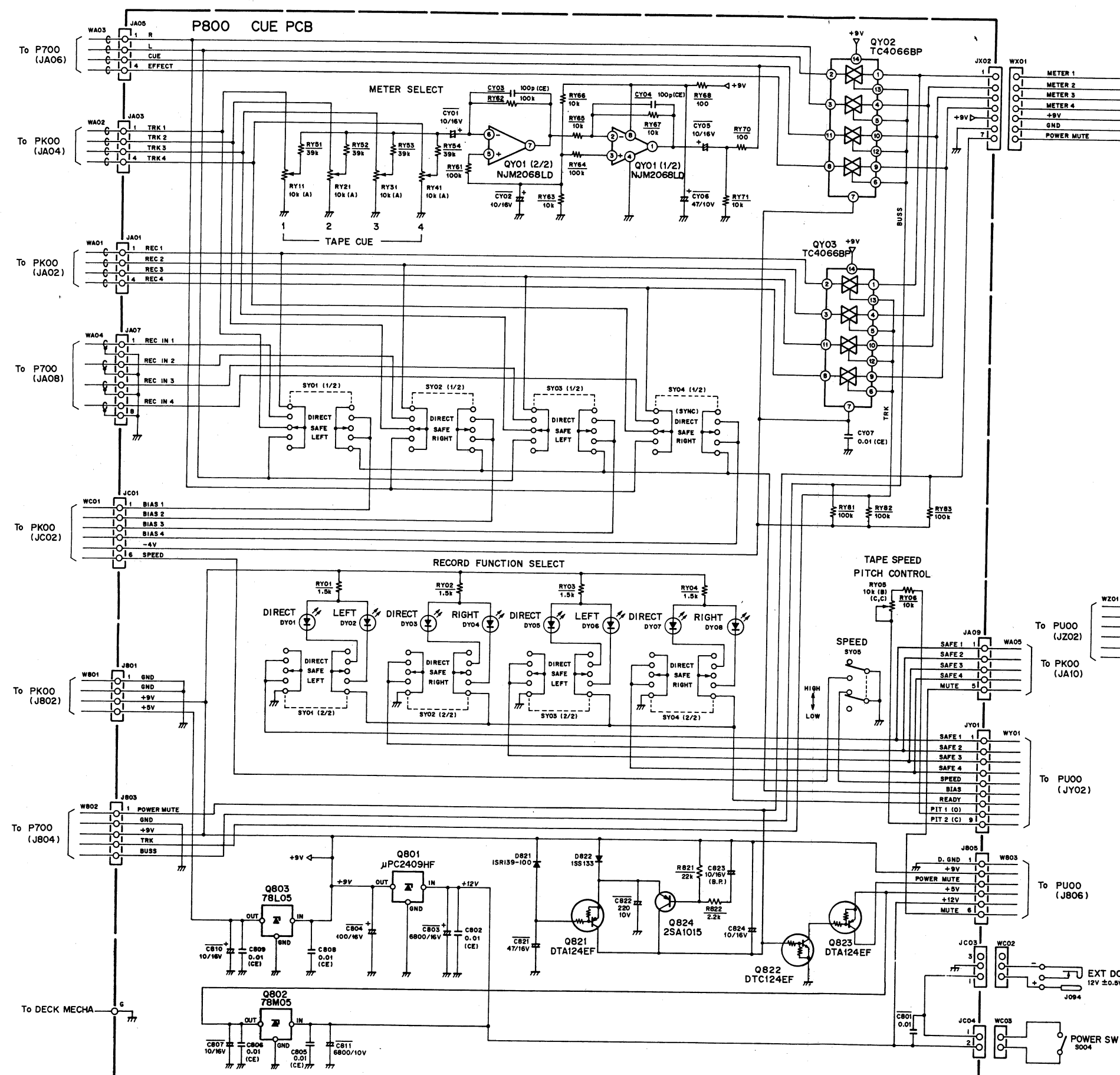


QK01





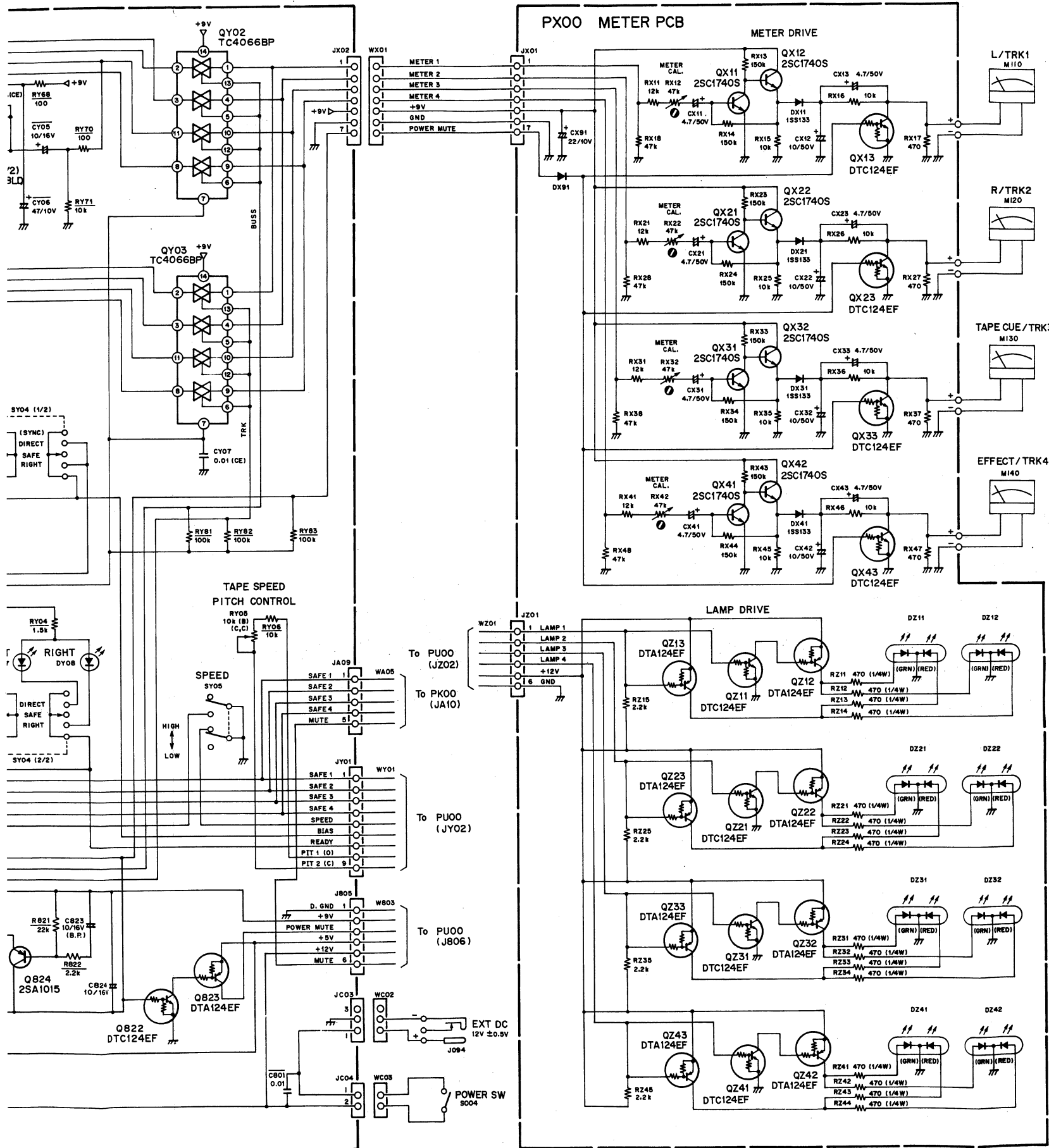




12. MIC

SYN

PIN NO.	
1	D1
2	D1
3	D1
4	D1
5	D1
6	R0
7	R0
8	R0
9	R0
10	R1
11	R1
12	R1
13	R1
14	R2
15	R2
16	R2
17	R2
18	RA
19	RA
20	R3
21	R3
22	R3
23	R3
24	R5
25	R5
26	R5
27	R5
28	R6
29	R6
30	R6
31	R6
32	Vcc

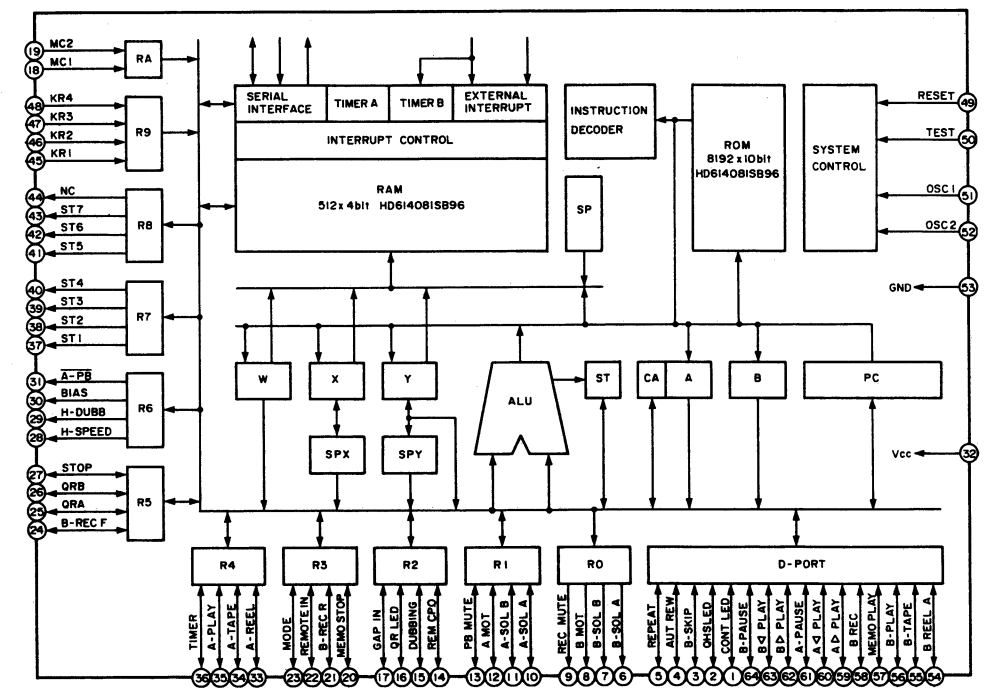


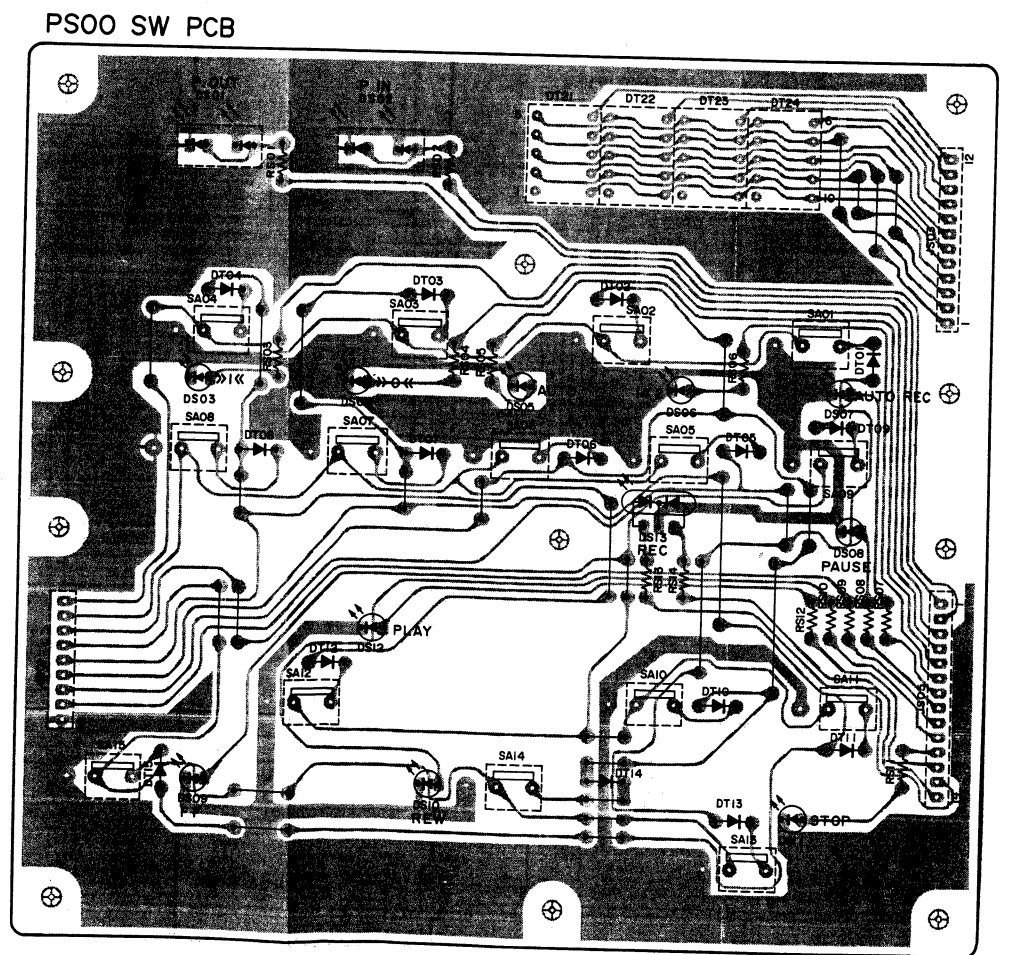
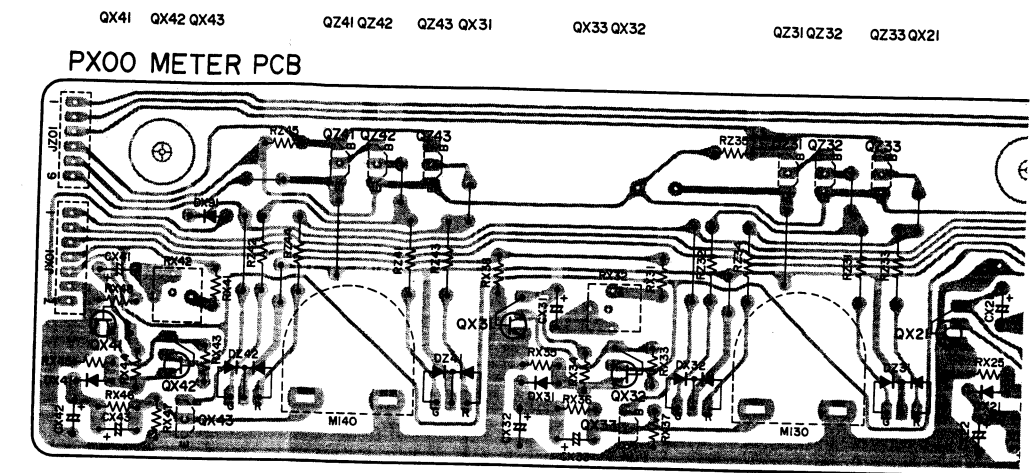
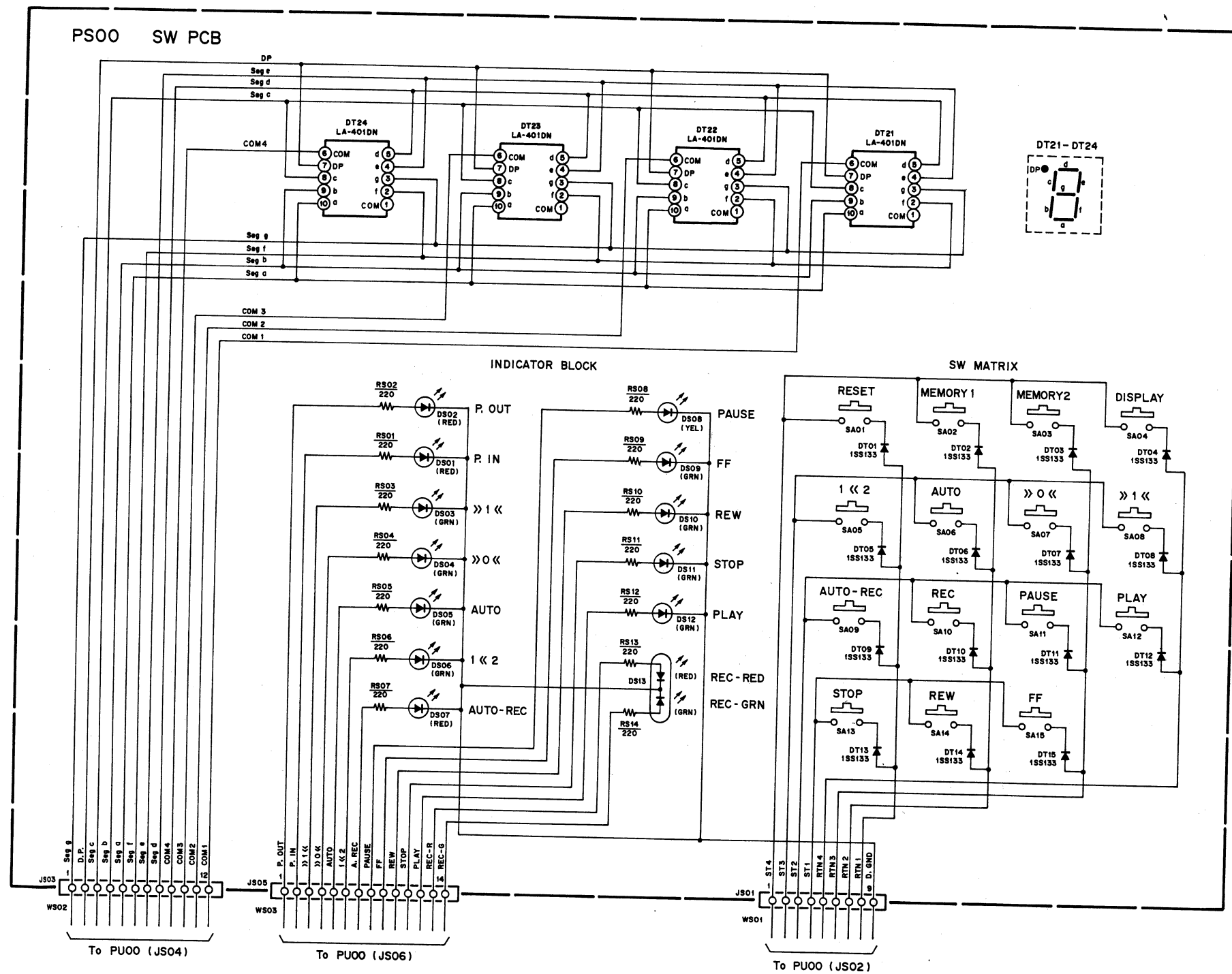
12. MICRO-PROCESSOR I/O PINS AND THEIR FUNCTIONS

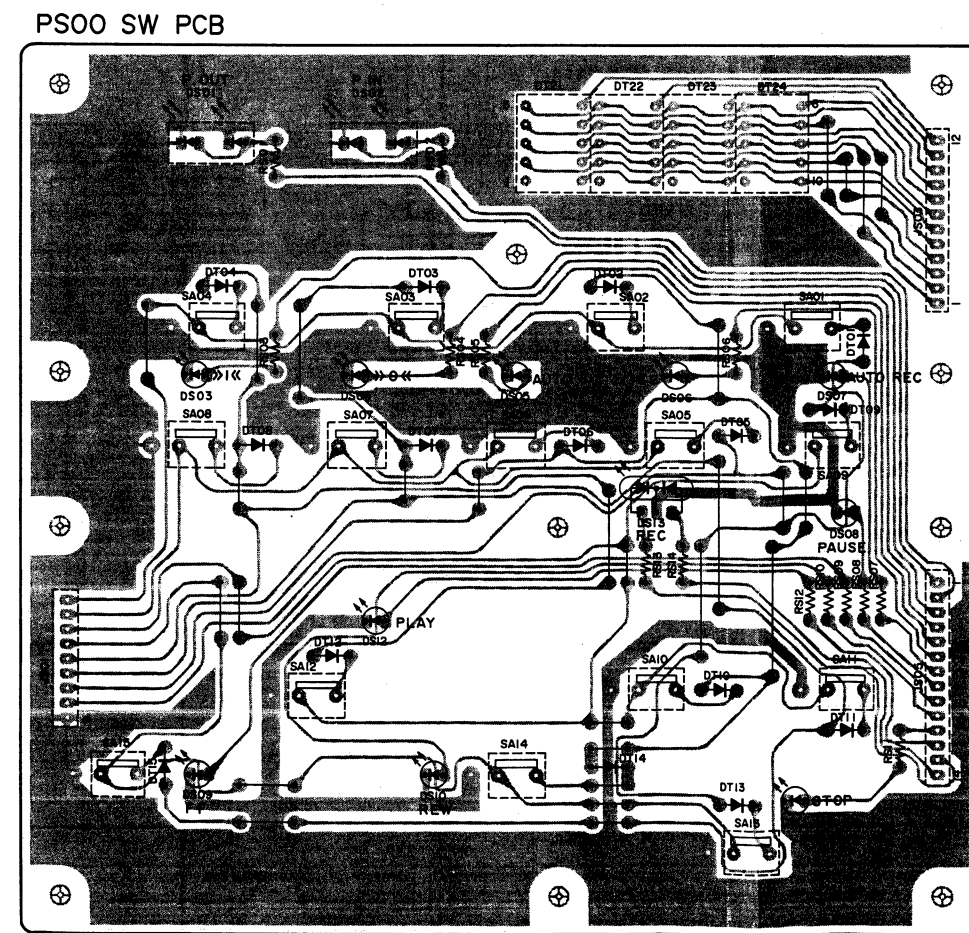
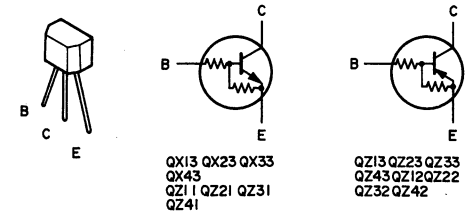
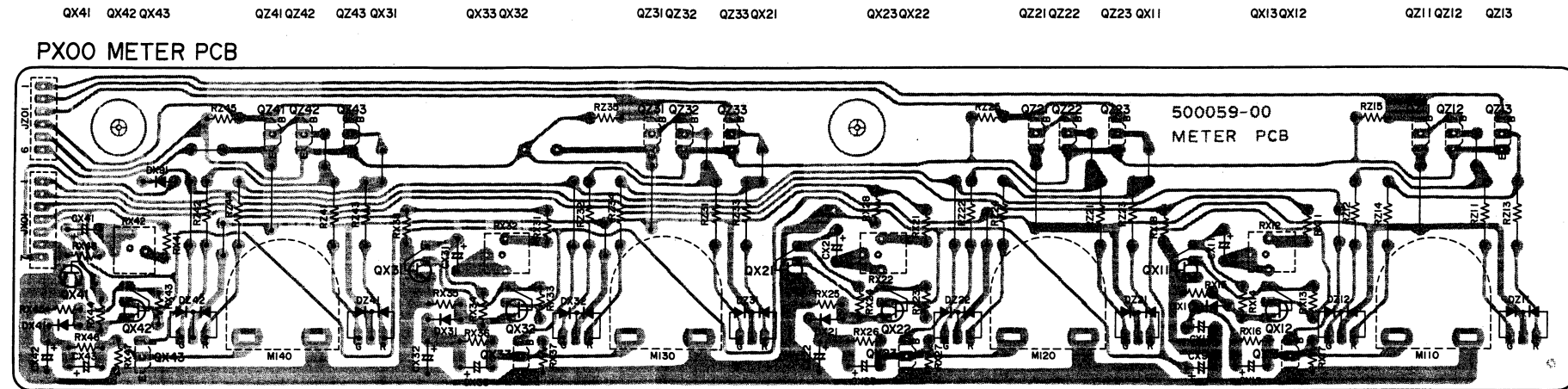
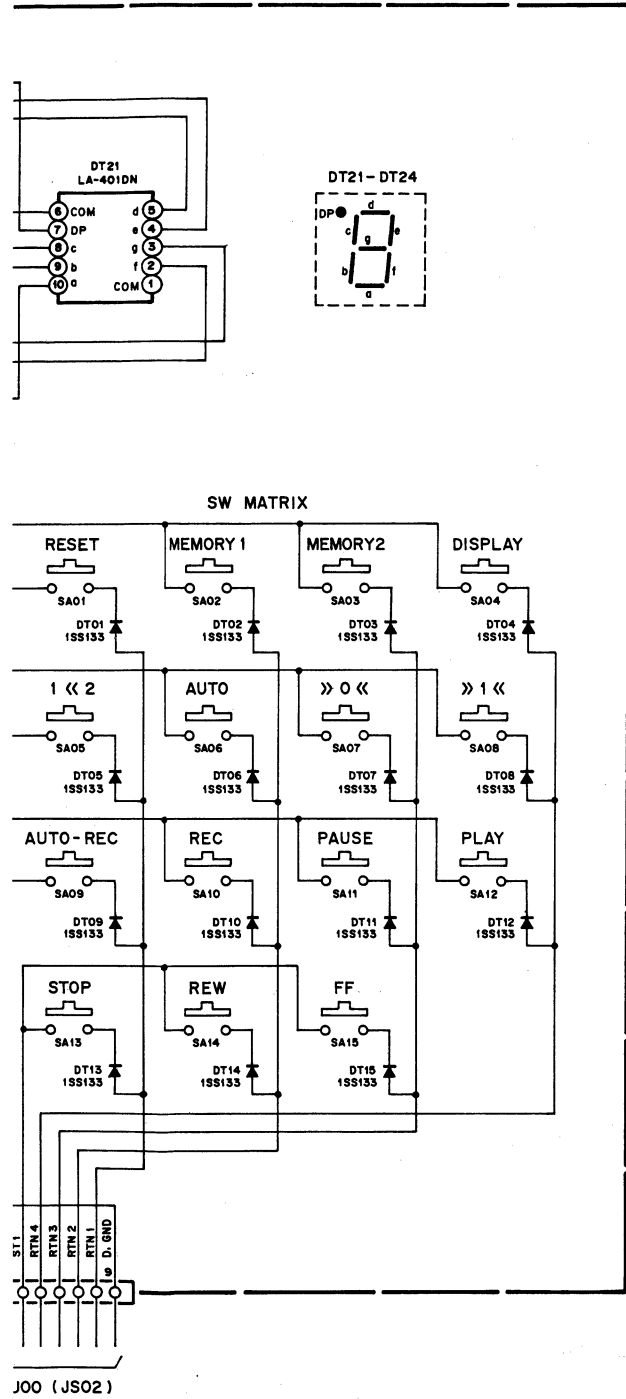
SYM NO. QU01 TYPE NO. HD614081SD45

PIN NO.	PORT NAME		I/O	ACT	FUNCTION	PIN NO.	PORT NAME		I/O	ACT	FUNCTION
1	D11	REW	O	H	LED-OUT (RWD)	33	R40/SCK	COM1	O	H	DYNAMIC DISPLAY D4 DIGIT
2	D12	STOP	O	H	LED-OUT (STOP)	34	R41/S1	COM2	O	H	DYNAMIC DISPLAY D3 DIGIT
3	D13	PLAY	O	H	LED-OUT (PLAY)	35	R42/S0	COM3	O	H	DYNAMIC DISPLAY D2 DIGIT
4	D14	REC-R	O	H	LED-OUT (REC-RED)	36	R43	COM4	O	H	DYNAMIC DISPLAY D1 DIGIT
5	D15	REC-G	O	H	LED-OUT (REC-GREEN)	37	R70	SEG d	O	L	DYNAMIC DISPLAY SEGMENT d
6	R00	LAMP 1	O	H	VU METER LAMP 1	38	R71	SEG e	O	L	DYNAMIC DISPLAY SEGMENT e
7	R01	LAMP 2	O	H	VU METER LAMP 2	39	R72	SEG f	O	L	DYNAMIC DISPLAY SEGMENT f
8	R02	LAMP 3	O	H	VU METER LAMP 3	40	R73	SEG a	O	L	DYNAMIC DISPLAY SEGMENT a
9	R03	LAMP 4	O	H	VU METER LAMP 4	41	R80	SEG b	O	L	DYNAMIC DISPLAY SEGMENT b
10	R10	REC-M	O	H	RECORD MUTE CONTROL	42	R81	SEG c	O	L	DYNAMIC DISPLAY SEGMENT c
11	R11	LINE-M	O	H	PLAY MUTE CONTROL	43	R82	SEG g	O	L	DYNAMIC DISPLAY SEGMENT g
12	R12	BIAS	O	H	BIAS OUT CONTROL	44	R83	D.P.	O	L	DYNAMIC DISPLAY DESIMAL POINT
13	R13	CUE-ATT	O	H	FAST CUEING ATTENUATION CONTROL	45	R90	SAFE 1	I	L	REC SELECT-1 SAFE INPUT
14	R20	SOL-A	O	H	SOLENOID DRIVE A	46	R91	SAFE 2	I	L	REC SELECT-2 SAFE INPUT
15	R21	SOL-B	O	H	SOLENOID DRIVE B	47	R92	SAFE 3	I	L	REC SELECT-3 SAFE INPUT
16	R22	MOTOR ON	O	H	MOTOR ON/OFF CONTROL	48	R93	SAFE 4	I	L	REC SELECT-4 SAFE INPUT
17	R23	SPEED	O	H	TAPE SPEED NORMAL/HIGH CONTROL	49	RESET		I	—	POWER ON RESET
18	RA0	R. PAUSE	I	L	REMOTE PAUSE INPUT	50	TEST		I	—	TEST MODE
19	RA1	R. PUNCH I/O	I	L	REMOTE PUNCH-IN/OUT INPUT	51	OSC1		I	—	} 4.0 MHz
20	R30	REC SW	I	L	RECORD ENABLE	52	OSC2		I	—	
21	R31	PACK	I	L	TAPE IN	53	GND		—	—	GROUND
22	R32	F/R PLAY	I	L	FF. REV. PLAY SW	54	D0	REEL P.	I	L	REEL PULSES
23	R33	SPD	I	H	TAPE SPEED NORMAL/HIGH INPUT	55	D1	READY	O	H	LED-OUT (REC SELECT LED)
24	R50	RTN 1	I	—	KEY MATRIX SIGNAL (IN)	56	D2	P-OUT	O	H	LED-OUT (PUNCH-OUT)
25	R51	RTN 2	I	—		57	D3	P-IN	O	H	LED-OUT (PUNCH-IN)
26	R52	RTN 3	I	—		58	D4	PAUSE	O	H	LED-OUT (PAUSE)
27	R53	RTN 4	I	—		59	D5	A. REC	O	H	LED-OUT (AUTO REC)
28	R60	ST1	O	—	KEY MATRIX SIGNAL (OUT)	60	D6	1 « 2	O	H	LED-OUT (AUTO REWIND)
29	R61	ST2	O	—		61	D7	AUTO	O	H	LED-OUT (AUTO PLAY)
30	R62	ST3	O	—		62	D8	» 0 «	O	H	LED-OUT (SEARCH ZERO)
31	R63	ST4	O	—		63	D9	» 1 «	O	H	LED-OUT (SEARCH MEMORY-1)
32	Vcc		—	—	POWER SUPPLY (+5V)	64	D10	FF	O	H	LED-OUT (F. FWD)

QU01 HD614081SD45







14. ELECTRICAL PARTS LIST

ASSIGNMENT OF COMMON PARTS CODES.

RESISTOR

R***: (1) GD05 xxx 140, Carbon film fixed resistor, $\pm 5\%$ 1/4W
R***: (2) GD05 xxx 160, Carbon film fixed resistor, $\pm 5\%$ 1/6W

① — Resistance value

Examples:

① Resistance value
0.1 Ω ...001 10 Ω ...100 1k Ω ...102 100k Ω ...104
0.5 Ω ...005 18 Ω ...180 2.7k Ω ...272 680k Ω ...684
1 Ω ...010 100 Ω ...101 10k Ω ...103 1M Ω ...105
6.8 Ω ...068 390 Ω ...391 22k Ω ...223 4.7M Ω ...475

(Note) Please distinguish 1/4W from 1/6W by the shape of parts used actually.

C***: CERAMIC CAP.

(1) DD1x xxx 370, Ceramic capacitor
Disc type
Temp.coef.P350~N1000,50V

① ②
Capacity value
Tolerance

Examples

① Tolerance (Capacity deviation)
 $\pm 0.25\text{pF}$...0
 $\pm 0.5\text{pF}$...1
 $\pm 5\%$...5
* Tolerance of COMMON PARTS handled here are as follows:
0.5pF~ 5pF... $\pm 0.25\text{pF}$
6pF~ 10pF... $\pm 0.5\text{pF}$
12pF~ 560pF... $\pm 5\%$
② Capacity value
0.5pF...005 3pF...030 100pF...101
1pF...010 10pF...100 220pF...221
1.5pF...015 47pF...470 560pF...561

C***: CERAMIC CAP.

(1) DK16 xxx 300, High dielectric constant ceramic capacitor
Disc type
Temp.chara. 2B4, 50V

①
Capacity value

Examples

② Capacity value
100pF...101 1000pF...102 10000pF...103
470pF...471 2200pF...222

C***: ELECTROLY CAP. (E), FILM CAP. (F)

(1) EA xxx xxx 10, Electrolytic capacitor
One-way lead type, Tolerance $\pm 20\%$

① ②
Working voltage
Capacity value

Examples

① Capacity value
01 μF ...104 4.7 μF ...475 100 μF ...107
0.33 μF ...334 10 μF ...106 330 μF ...337
1 μF ...105 22 μF ...226 1100 μF ...108
2200 μF ...228

② Working voltage

6.3V...006 25V...025
10V...010 35V...035
16V...016 50V...050

(2) DF15 xxx 350, Plastic film capacitor
One-way type, Mylar $\pm 5\%$ 50V

①
Capacity value

Examples

① Capacity value
0.001 μF (1000pF)...102 0.1 μF ...104
0.0018 μF ...182 0.56 μF ...564
0.01 μF ...103 1 μF ...105
0.015 μF ...153

REF. DESIG.	PART NO.	DESCRIPTION
		PK00-REC / PLAY AMP CIRCUIT BOARD
		PK00-CAPACITORS
CA12	4822 121 42708	Film 330pF $\pm 5\%$
CA22	4822 121 70307	Film 270pF $\pm 5\%$
CA52	4822 124 80516	Elect 10 μF 35V (LL)
CA54	4822 121 43381	Film 470pF $\pm 5\%$
CB12	4822 121 42708	Film 330pF $\pm 5\%$
CB22	4822 121 70307	Film 270pF $\pm 5\%$
CB54	4822 121 43381	Film 470pF $\pm 5\%$
CC12	4822 121 42708	Film 330pF $\pm 5\%$
CC22	4822 121 70307	Film 270pF $\pm 5\%$
CC52	4822 124 80516	Elect 10 μF 35V (LL)
CC54	4822 121 43381	Film 470pF $\pm 5\%$
CD12	4822 121 42708	Film 330pF $\pm 5\%$
CD22	4822 121 70307	Film 270pF $\pm 5\%$
CD52	4822 124 80516	Elect 10 μF 35V (LL)
CD54	4822 121 43381	Film 470pF $\pm 5\%$
CE01	4822 123 30375	Film 820pF $\pm 5\%$
CE05	4822 121 42344	Film 220pF $\pm 5\%$
CE06	4822 123 30375	Film 820pF $\pm 5\%$
CE07	4822 121 70306	Film 0.018 μF $\pm 5\%$
CE11	4822 123 30048	Film 0.01 μF $\pm 5\%$
CE12	4822 121 43381	Film 470pF $\pm 5\%$
CE29	4822 121 42708	Film 330pF $\pm 5\%$
CE52	4822 124 80516	Elect 10 μF 35V (LL)
CE57	4822 121 42466	Film 390pF $\pm 5\%$
CF01	4822 123 30375	Film 820pF $\pm 5\%$
CF05	4822 121 42344	Film 220pF $\pm 5\%$
CF06	4822 123 30375	Film 820pF $\pm 5\%$
CF07	4822 121 70306	Film 0.018 μF $\pm 5\%$
CF11	4822 123 30048	Film 0.01 μF $\pm 5\%$
CF12	4822 121 43381	Film 470pF $\pm 5\%$
CF29	4822 121 42708	Film 330pF $\pm 5\%$
CF52	4822 124 80516	Elect 10 μF 35V (LL)
CF57	4822 121 42466	Film 390pF $\pm 5\%$
CG01	4822 123 30375	Film 820pF $\pm 5\%$
CG05	4822 121 42344	Film 220pF $\pm 5\%$
CG06	4822 123 30375	Film 820pF $\pm 5\%$
CG07	4822 121 70306	Film 0.018 μF $\pm 5\%$
CG11	4822 123 30048	Film 0.01 μF $\pm 5\%$
CG12	4822 121 43381	Film 470pF $\pm 5\%$
CG29	4822 121 42708	Film 330pF $\pm 5\%$
CG52	4822 124 80516	Elect 10 μF 35V (LL)
CG57	4822 121 42466	Film 390pF $\pm 5\%$
CH01	4822 124 21903	Elect (B.P.) 1 μF 50V
CH81	4822 122 32486	Ceramic 0.01 μF $\pm 80\%$ -20%
CJ01	4822 123 30375	Film 820pF $\pm 5\%$
CJ05	4822 121 42344	Film 220pF $\pm 5\%$
CJ06	4822 123 30375	Film 820pF $\pm 5\%$
CJ07	4822 121 70306	Film 0.018 μF $\pm 5\%$
CJ11	4822 123 30048	Film 0.01 μF $\pm 5\%$
CJ12	4822 121 43381	Film 470pF $\pm 5\%$
CJ29	4822 121 42708	Film 330pF $\pm 5\%$
CJ52	4822 124 80516	Elect 10 μF 35V (LL)
CJ57	4822 121 42466	Film 390pF $\pm 5\%$
CL05	4822 121 70308	Film 0.027 μF $\pm 5\%$
CL08	4822 122 32486	Ceramic 0.01 μF $\pm 80\%$ -20%
C902	4822 122 32486	Ceramic 0.01 μF $\pm 80\%$ -20%
C903	4822 121 43379	Film 0.015 μF $\pm 5\%$
C906	4822 122 32486	Ceramic 0.01 μF $\pm 80\%$ -20%
C907	4822 122 32486	Ceramic 0.01 μF $\pm 80\%$ -20%
		PK00-RESISTORS
RA10	4822 100 20681	2.2K Ω , Trimming; PB Level
RA12	4822 100 20681	2.2K Ω , Trimming; PB EQ
RA50	4822 100 20681	2.2K Ω , Trimming; DEC Time
RA61	4822 116 82751	1K Ω $\pm 1\%$ 1/6W
RB10	4822 100 20681	2.2K Ω , Trimming; PB Level
RB12	4822 100 20681	2.2K Ω , Trimming; PB EQ

REF. DESIG.	PART NO.	DESCRIPTION
RC10	4822 100 20681	2.2K Ω , Trimming; PB Level
RC12	4822 100 20681	2.2K Ω , Trimming; PB EQ
RC50	4822 100 20681	2.2K Ω , Trimming; DEC Time
RC61	4822 116 82751	1K Ω $\pm 1\%$ 1/6W
RD10	4822 100 20681	2.2K Ω , Trimming; PB Level
RD12	4822 100 20681	2.2K Ω , Trimming; PB EQ
RE01	4822 100 11351	10K Ω , Trimming; Bias TRK 1
RE30	4822 100 11351	10K Ω , Trimming; REC Level
RE50	4822 100 20681	2.2K Ω , Trimming; NEC Time
RE61	4822 116 82751	1K Ω $\pm 1\%$ 1/6W
RF01	4822 100 11351	10K Ω , Trimming; Bias TRK 2
RF30	4822 100 11351	10K Ω , Trimming; REC Level
RG01	4822 100 11351	10K Ω , Trimming; Bias TRK 3
RG30	4822 100 11351	10K Ω , Trimming; REC Level
RG50	4822 100 20681	2.2K Ω , Trimming; NEC Time
RG61	4822 116 82751	1K Ω $\pm 1\%$ 1/6W
RH51	4822 100 11351	10K Ω , Trimming; SYNC Cancel
RJ01	4822 100 11351	10K Ω , Trimming; Bias TRK 4
RJ30	4822 100 11351	10K Ω , Trimming; REC Level
		PK00-SEMICONDUCTORS
DA01	4822 130 32778	Diode 1SS133
DA06	4822 130 32778	Diode 1SS133
DA10	4822 130 32778	Diode 1SS133
DA21	4822 130 32778	Diode 1SS133
DB01	4822 130 32778	Diode 1SS133
DB06	4822 130 32778	Diode 1SS133
DB10	4822 130 32778	Diode 1SS133
DB21	4822 130 32778	Diode 1SS133
DC01	4822 130 32778	Diode 1SS133
DC06	4822 130 32778	Diode 1SS133
DC10	4822 130 32778	Diode 1SS133
DC21	4822 130 32778	Diode 1SS133
DD01	4822 130 32778	Diode 1SS133
DD06	4822 130 32778	Diode 1SS133
DD10	4822 130 32778	Diode 1SS133
DD21	4822 130 32778	Diode 1SS133
DE01	4822 130 32778	Diode 1SS133
DE02	4822 130 32778	Diode 1SS133
DF01	4822 130 32778	Diode 1SS133
DF02	4822 130 32778	Diode 1SS133
DG01	4822 130 32778	Diode 1SS133
DG02	4822 130 32778	Diode 1SS133
DJ01	4822 130 32778	Diode 1SS133
DJ02	4822 130 32778	Diode 1SS133
DL01	4822 130 32778	Diode 1SS133
D901	4822 130 32778	Diode 1SS133
D904	4822 130 32778	Diode 1SS133
QA01	4822 209 63132	IC BA7755A
QA02	4822 209 32315	IC NJM2068L-D
QA03	4822 130 61525	Transistor, Digital DTC124EF
QA11	4822 130 43191	Transistor, Digital 2SC1741 (Q, R)
QA12	4822 130 43191	Transistor, Digital 2SC1741 (Q, R)
QA13	4822 130 42431	Transistor, Digital 2SC1740 (R, S)
QA14	4822 130 42431	Transistor, Digital 2SC1740 (R, S)
QA51	4822 209 82507	IC AN6291
QA71	4822 209 32315	IC NJM2068L-D
QA72	4822 130 63283	Transistor 2SC3327B
QA73	4822 130 42431	Transistor 2SC1740 (R, S)
QA74	4822 209 82279	Transistor, Digital DTA124EF
QB01	4822 209 63132	IC BA7755A
QB03	4822 130 61525	Transistor, Digital DTC124EF
QB11	4822 130 43191	Transistor 2SC1741 (Q, R)

REF. DESIG.	PART NO.	DESCRIPTION
QB12	4822 130 43191	Transistor 2SC1741 (Q, R)
QB13	4822 130 42431	Transistor 2SC1740 (R, S)
QB14	4822 130 42431	Transistor 2SC1740 (R, S)
QB72	4822 130 63283	Transistor 2SC3327B
QB73	4822 130 42431	Transistor 2SC1740 (R, S)
QB74	4822 209 82279	Transistor, Digital DTA124EF
QC01	4822 209 63132	IC BA7755A
QC02	4822 209 32315	IC NJM2068L-D
QC03	4822 130 61525	Transistor, Digital DTC124EF
QC11	4822 130 43191	Transistor 2SC1741 (Q, R)
QC12	4822 130 43191	Transistor 2SC1741 (Q, R)
QC13	4822 130 42431	Transistor 2SC1740 (R, S)
QC14	4822 130 42431	Transistor 2SC1740 (R, S)
QC51	4822 209 82507	IC AN6291
QC71	4822 209 32315	IC NJM2068L-D
QC72	4822 130 63283	Transistor 2SC3327B
QC73	4822 130 42431	Transistor 2SC1740 (R, S)
QC74	4822 209 82279	Transistor, Digital DTA124EF
QD01	4822 209 63132	IC BA7755A
QD03	4822 130 61525	Transistor, Digital DTC124EF
QD11	4822 130 43191	Transistor, Digital 2SC1741 (Q, R)
QD12	4822 130 43191	Transistor, Digital 2SC1741 (Q, R)
QD13	4822 130 42431	Transistor, Digital 2SC1740 (R, S)
QD14	4822 130 42431	Transistor, Digital 2SC1740 (R, S)
QD72	4822 130 63283	Transistor 2SC3327B
QD73	4822 130 42431	Transistor, Digital 2SC1740 (R, S)
QD74	4822 209 82279	Transistor, Digital DTA124EF
QE01	4822 209 72874	IC μ PC1297CA
QE02	4822 209 32315	IC NJM2068L-D
QE03	4822 209 32315	IC NJM2068L-D
QE11	4822 130 63282	Transistor 2SC3377
QE12	4822 130 42431	Transistor 2SC1740 (R, S)
QE13	4822 130 43191	Transistor 2SC1741 (Q, R)
QE14	4822 130 63281	F. E. T. 2SK362-BL
QE15	4822 130 63281	F. E. T. 2SK362-BL
QE16	4822 130 42431	Transistor 2SC1740 (R, S)
QE17	4822 130 42431	Transistor 2SC1740 (R, S)
QE31	4822 130 43191	Transistor 2SC1741 (Q, R)
QE51	4822 209 82507	IC AN6291
QE71	4822 130 42431	Transistor 2SC1740S (R, S)
QF11	4822 130 63282	Transistor 2SC3377
QF12	4822 130 42431	Transistor 2SC1740 (R, S)
QF13	4822 130 43191	Transistor 2SC1741 (Q, R)
QF14	4822 130 63281	F. E. T. 2SK362-BL
QF15	4822 130 63281	F. E. T. 2SK362-BL
QF16	4822 130 42431	Transistor 2SC1740S (R, S)
QF17	4822 130 42431	Transistor 2SC1740S (R, S)
QF31	4822 130 43191	Transistor 2SC1741 (Q, R)
QF71	4822 130 42431	Transistor 2SC1740 (R, S)
QG01	4822 209 72874	IC μ PC1297CA
QG02	4822 209 32315	IC NJM2068L-D
QG03	4822 209 32315	IC NJM2068L-D
QG11	4822 130 63282	Transistor 2SC3377
QG12	4822 130 42431	Transistor 2SC1740 (R, S)
QG13	4822 130 43191	Transistor 2SC1741 (Q, R)
QG14	4822 130 63281	F. E. T. 2SK362-BL
QG15	4822 130 63281	F. E. T. 2SK362-BL
QG16	4822 130 42431	Transistor 2SC1740S (R, S)
QG17	4822 130 42431	Transistor 2SC1740S (R, S)
QG31	4822 130 43191	Transistor 2SC1741 (Q, R)
QG51	4822 209 82507	IC AN6291
QG71	4822 130 42431	Transistor 2SC1740S (R, S)
QH01	4822 209 82279	Transistor, Digital DTA124EF
QH02	4822 209 82279	Transistor, Digital DTA124EF
QH03	4822 209 82279	Transistor, Digital DTA124EF
QH11	4822 130 61525	Transistor, Digital DTC124EF
QH21	4822 130 61525	Transistor, Digital DTC124EF
QJ11	4822 130 63282	Transistor 2SC3377
QJ12	4822 130 42431	Transistor 2SC1740 (R, S)
QJ13	4822 130 43191	Transistor 2SC1741 (Q, R)
QJ14	4822 130 63281	F. E. T. 2SK362-BL
QJ15	4822 130 63281	F. E. T. 2SK362-BL
QJ16	4822 130 42431	Transistor 2SC1740 (R, S)
QJ17	4822 130 42431	Transistor 2SC1740 (R, S)
QJ31	4822 130 43191	Transistor 2SC1741 (Q, R)
QJ71	4822 130 42431	Transistor 2SC1740 (R, S)

REF. DESIG	PART NO.	DESCRIPTION
QL01	4822 130 63282	Transistor 2SC3377
QH51	4822 209 32315	IC NJM2068L-D
Q901	4822 130 63282	Transistor 2SC3377
PK00-MISCELLANEOUS		
LA01	4822 153 70064	Choke Coil 8mH
LA02	4822 153 70064	Choke Coil 8mH
LB01	4822 153 70064	Choke Coil 8mH
LB02	4822 153 70064	Choke Coil 8mH
LC01	4822 153 70064	Choke Coil 8mH
LC02	4822 153 70064	Choke Coil 8mH
LD01	4822 153 70064	Choke Coil 8mH
LD02	4822 153 70064	Choke Coil 8mH
LE01	4822 148 81318	Bias OSC 80KHz
LE02	4822 148 81319	Erase OSC 80KHz
LE03	4822 153 70064	Choke Coil 8mH
LE04	4822 153 70064	Choke Coil 8mH
LF01	4822 148 81318	Bias OSC 80KHz
LF02	4822 148 81319	Erase OSC 80KHz
LF03	4822 153 70064	Choke Coil 8mH
LF04	4822 153 70064	Choke Coil 8mH
LG01	4822 148 81318	Bias OSC 80KHz
LG02	4822 148 81319	Erase OSC 80KHz
LG03	4822 153 70064	Choke Coil 8mH
LG04	4822 153 70064	Choke Coil 8mH
LJ01	4822 148 81318	Bias OSC 80KHz
LJ02	4822 148 81319	Erase OSC 80KHz
LJ03	4822 153 70064	Choke Coil 8mH
LJ04	4822 153 70064	Choke Coil 8mH
LL01	4822 157 70494	Choke Coil 1.2mH
LL02	4822 148 81321	Bias OSC 80KHz
L901	4822 148 81319	Erase OSC 80KHz
L902	4822 157 70495	Choke Coil 330 μ H
L903	4822 157 70495	Choke Coil 330 μ H
PS00-KEY SW/ DISPLAY CIRCUIT BOARD		
PS00-SEMICONDUCTORS		
DS01	4822 130 83371	L.E. D. LT9200D (RED)
DS02	4822 130 83371	L.E. D. LT9200D (RED)
DS03	4822 130 82964	L. E. D. GL3KG8 (GRN)
DS06	4822 130 82955	L. E. D. GL3PR8 (RED)
DS07	4822 130 80325	L. E. D. GL3AY8 (YEL)
DS08	4822 130 82964	L. E. D. GL3KG8 (GRN)
DS09	4822 130 82159	L. E. D. GL3ED8 (RED/ GRN)
DS12	4822 130 32778	Diode 1SS133
DS13	4822 130 83372	L. E. D. LA-401DN (ORG) 7SEG
DT01	4822 130 32778	Diode 1SS133
DT15	4822 130 83372	L. E. D. LA-401DN (ORG) 7SEG
DT21	4822 130 83372	L. E. D. LA-401DN (ORG) 7SEG
DT24	4822 130 83372	L. E. D. LA-401DN (ORG) 7SEG
PS00-MISCELLANEOUS		
SA01	4822 276 13399	Switch Tact
SA15	4822 276 13399	Switch Tact

REF. DESIG.	PART NO.	DESCRIPTION
PU00-CPU CIRCUIT BOARD		
PU00-CAPACITORS		
CM01	4822 122 30103	Ceramic 0.022 μ F +80% -20%
CU03	4822 122 40617	Ceramic,stocked 0.1 μ F +80% 20%
CU10	4822 122 32486	Ceramic 0.01 μ F +80% -20%
CU13	4822 122 32486	Ceramic 0.01 μ F +80% -20%
PU00-RESISTORS		
RM09	4822 100 11351	10K Ω (B), Trimming
RM11	4822 100 11351	10K Ω (B), Trimming
RU81	4822 111 92145	10K Ω x 5, Array
RU82	4822 111 92145	10K Ω x 5, Array
RU83	4822 111 92144	10K Ω x 8, Array
RU84	4822 111 92145	10K Ω x 5, Array
RU85	4822 111 92146	10K Ω x 4, Array
RU86	4822 111 92145	10K Ω x 5, Array
PU00-SEMICONDUCTORS		
DM01	4822 130 32816	Diode 1SR35-200A
DM02	4822 130 32816	Diode 1SR35-200A
DM03	4822 130 32816	Diode 1SR35-200A
DU11	4822 130 32778	Diode 1SS133
DU31	4822 130 32778	Diode 1SS133
DU34	4822 130 32778	Diode 1SS133
DU51	4822 130 32778	Diode 1SS133
DU52	4822 130 32778	Diode 1SS133
QM01	4822 130 61525	Transistor, Digital DTC124EF
QM02	4822 130 63285	Transistor, Digital 2SD1994A
QM03	4822 130 61525	Transistor, Digital DTC124EF
QM04	4822 130 63285	Transistor, Digital 2SD1994A
QM05	4822 130 61525	Transistor, Digital DTC124EF
QM06	4822 130 63286	Transistor, Digital 2SD1266A
QM07	4822 130 61525	Transistor, Digital DTC124EF
QM08	4822 130 61525	Transistor, Digital DTC124EF
QM09	4822 209 82279	Transistor, Digital DTA124EF
QM10	4822 130 63281	FET 2SK362-BL
QM11	4822 130 63281	FET 2SK362-BL
QM12	4822 130 63281	FET 2SK362-BL
QR01	4822 130 43794	Transistor, Digital 2SC1815 (Y, GR)
QR04	4822 209 12553	IC TC74HC240
QR05	4822 209 12553	IC TC74HC240
QU01	4822 209 32318	Microprocessor HD614081S
QU02	4822 209 82279	Transistor, Digital DTA124EF
QU03	4822 209 82279	Transistor, Digital DTA124EF
QU11	4822 130 61525	Transistor, Digital DTC124EF
QU12	4822 130 63279	Transistor, Digital DTC143EF
QU13	4822 130 61525	Transistor, Digital DTC124EF
QU15	4822 130 61525	Transistor, Digital DTC124EF
QU41	4822 130 61525	Transistor, Digital DTC124EF
QU44	4822 130 61525	Transistor, Digital DTC124EF
QU51	4822 130 61525	Transistor, Digital DTC124EF
QU53	4822 130 61525	Transistor, Digital DTC124EF
QU54	4822 130 61525	Transistor, Digital DTC124EF
PU00-MISCELLANEOUS		
LU01	4822 157 70493	Filter EXC-EMT271BT
LU02	4822 157 70493	Filter EXC-EMT271BT
LU11	4822 280 20532	Relay MZ-12HG
XU01	4822 242 81466	Crystal 4MHz

REF. DESIG.	PART NO.	DESCRIPTION
		PV00-INPUT JACK CIRCUIT BOARD
JV41 } JV46 JV51 } JV54	4822 267 31499	Jack, CH1-CH6
	4822 267 31643	Jack, Insert CH1-CH4
		PV01-XLR JACK CIRCUIT BOARD
RV90	4822 101 30817	Variable Resistor 10K Ω (A) x 2
JV81 } JV84	4822 267 31645	Jack, Cannon; Mic/ Line
		PW00-OUTPUT/INPUT JACK CIRCUIT BOARD
		PW00-CAPACITORS
CW01 } CW05	4822 124 21903	Elect 1 μ F 50V
		PW00-SEMICONDUCTORS
QW01 } QW05	4822 130 63284	Transistor 2SC3327A
		PW00-MISCELLANEOUS
JW41 JW51 JW52 JW53 JW61 JW71 JW72 JW81 JW82	4822 290 81588 4822 290 81589 4822 290 81589 4822 290 81589 4822 290 81589 4822 267 31499 4822 267 31499 4822 267 31499 4822 267 31499	Jack, RCA; 2P RED / WHT Jack, RCA; 2P BLK Jack, RCA; 2P BLK Jack, RCA; 2P BLK Jack, RCA; 2P BLK Jack, EFF, RTN (L/ Mono) Jack, EFF, RTN (R) Jack, EFF, SEND Jack, Tape CUE Out
		PX00-METER CIRCUIT BOARD
		PX00-CAPACITORS
CX91	4822 124 80515	Elect 22 μ F 10V
		PX00-RESISTORS
RX12 RX22 RX32 RX42	4822 100 11372 4822 100 11372 4822 100 11372 4822 100 11372	47K Ω (B), Trimming; Meter 1 47K Ω (B), Trimming; Meter 2 47K Ω (B), Trimming; Meter 3 47K Ω (B), Trimming; Meter 4
		PX00-SEMICONDUCTORS
DX11 DX21 DX31 DX41 DX91	4822 130 32778 4822 130 32778 4822 130 32778 4822 130 32778 4822 130 32778	Diode 1SS133 Diode 1SS133 Diode 1SS133 Diode 1SS133 Diode 1SS133
DZ11 DZ12 DZ21 DZ22 DZ31 DZ32 DZ41 DZ42	4822 130 82159 4822 130 82159 4822 130 82159 4822 130 82159 4822 130 82159 4822 130 82159 4822 130 82159 4822 130 82159	L. E. D. GL3ED8 (RED/ GRN) L. E. D. GL3ED8 (RED/ GRN) L. E. D. GL3ED8 (RED/ GRN) L. E. D. GL3ED8 (RED/ GRN) L. E. D. GL3ED8 (RED/ GRN) L. E. D. GL3ED8 (RED/ GRN) L. E. D. GL3ED8 (RED/ GRN) L. E. D. GL3ED8 (RED/ GRN)

REF. DESIG.	PART NO.	DESCRIPTION
QX11 QX12 QX13 QX21 QX22 QX23 QX31 QX32 QX33 QX41 QX42 QX43	4822 130 42431 4822 130 42431 4822 130 61525 4822 130 42431 4822 130 42431 4822 130 61525 4822 130 42431 4822 130 42431 4822 130 61525 4822 130 42431 4822 130 42431 4822 130 61525	Transistor 2SC1740S (R, S) Transistor 2SC1740S (R, S) Transistor, Digital DTC124EF Transistor 2SC1740S (R, S) Transistor 2SC1740S (R, S) Transistor, Digital DTC124EF Transistor 2SC1740S (R, S) Transistor 2SC1740S (R, S) Transistor, Digital DTC124EF Transistor 2SC1740S (R, S) Transistor 2SC1740S (R, S) Transistor, Digital DTC124EF
QZ11 QZ12 QZ13 QZ21 QZ22 QZ23 QZ31 QZ32 QZ33 QZ41 QZ42 QZ43	4822 130 61525 4822 209 82279 4822 209 82279 4822 130 61525 4822 209 82279 4822 209 82279 4822 130 61525 4822 209 82279 4822 209 82279 4822 130 61525 4822 209 82279 4822 209 82279	Transistor, Digital DTC124EF Transistor, Digital DTA124EF Transistor, Digital DTA124EF Transistor, Digital DTC124EF Transistor, Digital DTA124EF Transistor, Digital DTA124EF Transistor, Digital DTC124EF Transistor, Digital DTA124EF Transistor, Digital DTA124EF Transistor, Digital DTC124EF Transistor, Digital DTA124EF Transistor, Digital DTA124EF
		PX00-MISCELLANEOUS
MI10 MI20 MI30 MI40	4822 345 31002 4822 345 31002 4822 345 31002 4822 345 31002	D.C. Meter 200-S19-236 D.C. Meter 200-S19-236 D.C. Meter 200-S19-236 D.C. Meter 200-S19-236
		P700-MIXER AMP VOILUME CIRCUIT BOARD
		P700-CAPACITORS
CK03 CK04	4822 122 32486 4822 122 32486	Ceramic 0.01 μ F +80% -20% Ceramic 0.01 μ F +80% -20%
C103 C115 C136 C137 C203 C215 C236 C237 C303 C315	4822 122 32486 4822 122 32486 4822 121 70219 4822 121 70219 4822 122 32486 4822 122 32486 4822 121 70219 4822 121 70219 4822 122 32486 4822 122 32486	Ceramic 0.01 μ F +80% -20% Ceramic 0.01 μ F +80% -20% Film 8200pF \pm 5% Film 8200pF \pm 5% Ceramic 0.01 μ F +80% -20% Ceramic 0.01 μ F +80% -20% Film 8200pF \pm 5% Film 8200pF \pm 5% Ceramic 0.01 μ F +80% -20% Ceramic 0.01 μ F +80% -20%
C336 C337 C403 C415 C436 C437 C515	4822 121 70219 4822 121 70219 4822 122 32486 4822 122 32486 4822 121 70219 4822 121 70219 4822 122 32486	Film 8200pF \pm 5% Film 8200pF \pm 5% Ceramic 0.01 μ F +80% -20% Ceramic 0.01 μ F +80% -20% Film 8200pF \pm 5% Film 8200pF \pm 5% Ceramic 0.01 μ F +80% -20%
		P700-RESISTORS
RN00 RN30 RN55 RN70 RN80 RN98 RN99	4822 101 30816 4822 101 30811 4822 101 30811 4822 101 30816 4822 101 30816 4822 052 11339 4822 052 11339	10K Ω (A) x 2, Variable 10K Ω (A), Variable 10K Ω (A), Variable 10K Ω (A) x 2, Variable 10K Ω (A) x 2, Variable 3.3 Ω NF \pm 5% 1/2W 3.3 Ω NF \pm 5% 1/2W
R110 R120 R140 R150 R160 R165 R180 R185 R210 R220	4822 101 30812 4822 101 30822 4822 101 30813 4822 101 30818 4822 101 30815 4822 101 30815 4822 101 30814 4822 101 30811 4822 101 30812 4822 101 30822	10K Ω (C), Variable 50K Ω (A), Variable 100K Ω (B), Variable 100K Ω (C) x 2, Variable 50K Ω (B), Variable 50K Ω (B), Variable 5K Ω (B), Variable 10K Ω (A), Variable 10K Ω (C), Variable 50K Ω (A), Variable
R240 R250 R260 R265	4822 101 30813 4822 101 30818 4822 101 30815 4822 101 30815	100K Ω (B), Variable 100K Ω (C), Variable 50K Ω (B), Variable 50K Ω (B), Variable

REF. DESIG.	PART NO.	DESCRIPTION
R280	4822 101 30814	5K Ω (B), Variable
R285	4822 101 30811	10K Ω (A), Variable
R310	4822 101 30812	10K Ω (C), Variable
R320	4822 101 30822	50K Ω (A), Variable
R340	4822 101 30813	100K Ω (B), Variable
R350	4822 101 30818	100K Ω (C) x 2, Variable
R360	4822 101 30815	50K Ω (B), Variable
R365	4822 101 30815	50K Ω (B), Variable
R380	4822 101 30814	5K Ω (B), Variable
R385	4822 101 30811	10K Ω (A), Variable
R410	4822 101 30812	10K Ω (C), Variable
R420	4822 101 30822	50K Ω (A), Variable
R440	4822 101 30813	100K Ω (B), Variable
R450	4822 101 30818	100K Ω (C) x 2, Variable
R460	4822 101 30815	50K Ω (B), Variable
R465	4822 101 30815	50K Ω (B), Variable
R480	4822 101 30814	5K Ω (B), Variable
R485	4822 101 30811	10K Ω (A), Variable
R510	4822 101 30812	10K Ω (C), Variable
R520	4822 101 30822	50K Ω (A), Variable
R560	4822 101 30815	50K Ω (B), Variable
R565	4822 101 30815	50K Ω (B), Variable
R580	4822 101 30814	5K Ω (B), Variable
R585	4822 101 30811	10K Ω (A), Variable
R610	4822 101 30812	10K Ω (C), Variable
R620	4822 101 30822	50K Ω (A), Variable
R660	4822 101 30815	50K Ω (B), Variable
R665	4822 101 30815	50K Ω (B), Variable
R680	4822 101 30814	5K Ω (B), Variable
R685	4822 101 30811	10K Ω (A), Variable
R720	4822 101 30819	10K Ω (A) x 2, Variable
P700-SEMICONDUCTORS		
QK01	4822 209 32315	IC NJM2068L-D
QK02	4822 209 32315	IC NJM2068L-D
QN01	4822 209 32315	IC NJM2068L-D
QN02	4822 209 32316	IC NJM2073S
QN03	4822 209 32316	IC NJM2073S
QN31	4822 209 32315	IC NJM2068L-D
QN51	4822 209 32315	IC NJM2068L-D
Q101	4822 209 32315	IC NJM2068L-D
Q104		
Q105	4822 130 63281	F. E. T. 2SK362-BL
Q106	4822 209 32315	IC NJM2068L-D
Q201	4822 209 32315	IC NJM2068L-D
Q204		
Q205	4822 130 63281	F. E. T. 2SK362-BL
Q301	4822 209 32315	IC NJM2068L-D
Q304		
Q305	4822 130 63281	F. E. T. 2SK362-BL
Q306	4822 209 32315	IC NJM2068L-D
Q401	4822 209 32315	IC NJM2068L-D
Q404		
Q405	4822 130 63281	F. E. T. 2SK362-BL
Q501	4822 209 32315	IC NJM2068L-D
Q504	4822 209 32315	IC NJM2068L-D
Q604	4822 209 32315	IC NJM2068L-D
Q701	4822 209 32315	IC NJM2068L-D
Q702	4822 209 32315	IC NJM2068L-D
P700-MISCELLANEOUS		
SK01	4822 277 21687	Switch, Slide Sync
SN01	4822 277 21686	Switch, Slide Input
SN02	4822 277 21687	Switch, Slide Meter
SN03	4822 277 21687	Switch, Slide DBX
S101	4822 276 13401	Switch, Push XLR CH1
S102	4822 277 21686	Switch, Slide Input CH1
S103	4822 276 13401	Switch, Push Mid-EQ CH1
S201	4822 276 13401	Switch, Push XLR CH2
S202	4822 277 21686	Switch, Slide Input CH2
S203	4822 276 13401	Switch, Push Mid-EQ CH2
S301	4822 276 13401	Switch, Push XLR CH3

REF. DESIG.	PART NO.	DESCRIPTION
S302	4822 277 21686	Switch, Slide Input CH3
S303	4822 276 13401	Switch, Push Mid-EQ CH3
S401	4822 276 13401	Switch, Push XLR CH3
S402	4822 277 21686	Switch, Slide Input CH4
S403	4822 276 13401	Switch, Push Mid-EQ CH4
S502	4822 277 21686	Switch, Slide Direct CH5
S602	4822 277 21686	Switch, Slide Direct CH6
P800-CUE VOLUME CIRCUIT BOARD		
P800-CAPACITORS		
CY07	4822 122 32486	Ceramic 0.01 μ F +80% -20%
C802	4822 122 32486	Ceramic 0.01 μ F +80% -20%
C805	4822 122 32486	Ceramic 0.01 μ F +80% -20%
C806	4822 122 32486	Ceramic 0.01 μ F +80% -20%
C808	4822 122 32486	Ceramic 0.01 μ F +80% -20%
C809	4822 122 32486	Ceramic 0.01 μ F +80% -20%
C823	4822 124 23112	Elect (B. P.) 10 μ F 16V
C824	4822 124 23112	Elect (B. P.) 10 μ F 16V
P800-RESISTORS		
RY05	4822 101 30821	10K Ω (B), Variable
RY11	4822 101 30811	10K Ω (A), Variable
RY21	4822 101 30811	10K Ω (A), Variable
RY31	4822 101 30811	10K Ω (A), Variable
RY41	4822 101 30811	10K Ω (A), Variable
P800-SEMICONDUCTORS		
DY01	4822 130 82955	L. E. D. GL3PR8 (RED)
DY08		
D821	4822 130 32778	Diode 1SS133
D822	4822 130 32778	Diode 1SS133
QY01	4822 209 32315	IC NJM2068L-D
QY02	4822 209 82569	IC TC4066BP
QY03	4822 209 82569	IC TC4066BP
Q801	4822 209 32317	IC μ PC2409HF
Q802	4822 209 61847	IC NJM78M05FA
Q803	4822 209 71373	IC NJM78L05A
Q821	4822 209 82279	Transistor, Digital DTA124EF
Q822	4822 130 42961	Transistor 2SA1015
Q823	4822 130 61525	Transistor, Digital DTC124EF
Q824	4822 209 82279	Transistor, Digital DTA124EF
P800-MISCELLANEOUS		
SY01	4822 277 21688	Switch, Slide
SY04		
SY05	4822 277 21687	Switch, Slide

NOTE ON SAFETY :

Symbol \blacktriangle Fire or electrical shock hazard. Only original parts should be used to replace any part marked with symbol \blacktriangle . Any other component substitution (other than original type), may increase risk of fire or electrical shock hazard.